Chapter 3

Findings

This chapter presents the results of the evaluation of NSI data based on the methodology described in Chapter 2. This discussion includes a summary of the results of national and regional assessments. These summary results do not include locations with contaminated sediment not identified in the NSI database. The data compiled for the NSI database are primarily from large national electronic databases. Data from many sampling and testing studies have not yet been incorporated into the NSI database. Thus, it is highly likely that additional locations with sediment contamination do not appear in this summary. The final section in this chapter presents a comparison of applying the methodology presented in Chapter 2 to the data used for the first report to Congress.

National Assessment

EPA evaluated a total of 19,470 sampling stations nationwide as part of the NSI data evaluation (Figure 3-1). The evaluation included data collected from 1990 through 1999. Of the sampling stations evaluated, 7,600 stations (39 percent) were classified as Tier 1; 6,281 (32 percent) were classified as Tier 2; and 5,589 (29 percent) were classified as Tier 3 (Table 3-1). As described in more detail later, the frequency of Tier 1 classification based on the evaluation of all NSI data is greater than that based on the evaluation of data sets derived from purely random sampling. This suggests that state monitoring programs (accounting for the majority of the NSI data) have tended to focus their sampling efforts on areas where contamination is known or suspected to occur.

The national distribution of Tier 1 sampling stations is illustrated in Figure 3-2. The distribution of Tier 1 stations depicted in Figure 3-2 must be viewed in the context of the distribution of all sampling stations depicted in Figure 3-1. Table 3-1 presents the number of sampling stations in each tier by EPA region. The greater number of Tier 1 and Tier 2 sampling stations in some regions is to some degree a function of a larger set of available data. Although there are nine times more Tier 1 stations in EPA Region 4 (southeastern states) than in EPA Region 8 (mountain states), there are also nine times more Tier 3 stations in Region 4.

The NSI database sampling stations were located in 5,695 individual river reaches (Table 3-1) throughout the contiguous United States (based on EPA's River Reach File 1; Bondelid and Hanson, 1990). In the contiguous United States, there are 64,591 reaches representing approximately one million miles of coastal shorelines, lake shorelines, or lengths of stream between two major tributaries. NSI database sampling stations were located in approximately 8.8 percent of all river reaches identified in the contiguous United States (Table 3-1). Approximately three-fourths (77.6 percent) of the 5,695 reaches had one or two NSI database sampling stations. Less than 4 percent of the 5,695 reaches had more than 10 NSI database sampling stations. Approximately 3.3 percent of all river reaches in the United States contained at least one sampling station classified as Tier 1 (Figure 3-3). Three percent of all reaches contained at least one sampling station classified as Tier 2 (but none as Tier 1). In 2.5 percent of reaches in the contiguous United States, all of the sampling stations were classified as Tier 3. EPA has not cataloged river reaches (at the River Reach 1 level) outside the contiguous United States (e.g., Alaska, Hawaii, Puerto Rico), and some sampling stations in the ocean were not linked to a specific reach. Sampling bias toward areas of known or suspected contamination might be more pronounced in some regions than in others and could be related to the relative extent of sampling.
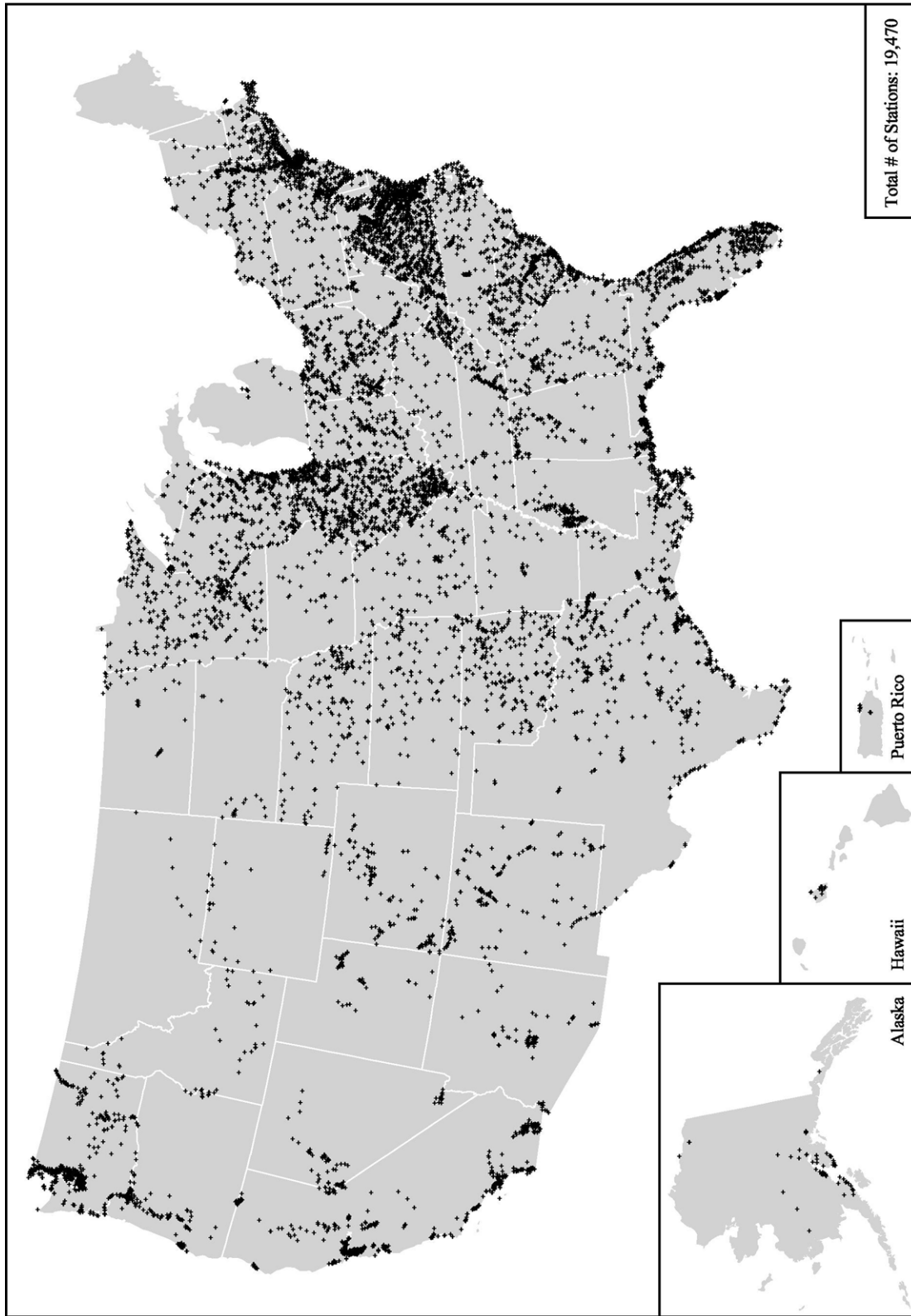
Figure 3-1. Location of All Evaluated NSI Sampling Stations.

Total # of Stations: 19,470

Puerto Rico

Hawaii

Alaska

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Table 3-1. National Assessment: Evaluation Results for Sampling Stations and River Reaches by EPA Region.

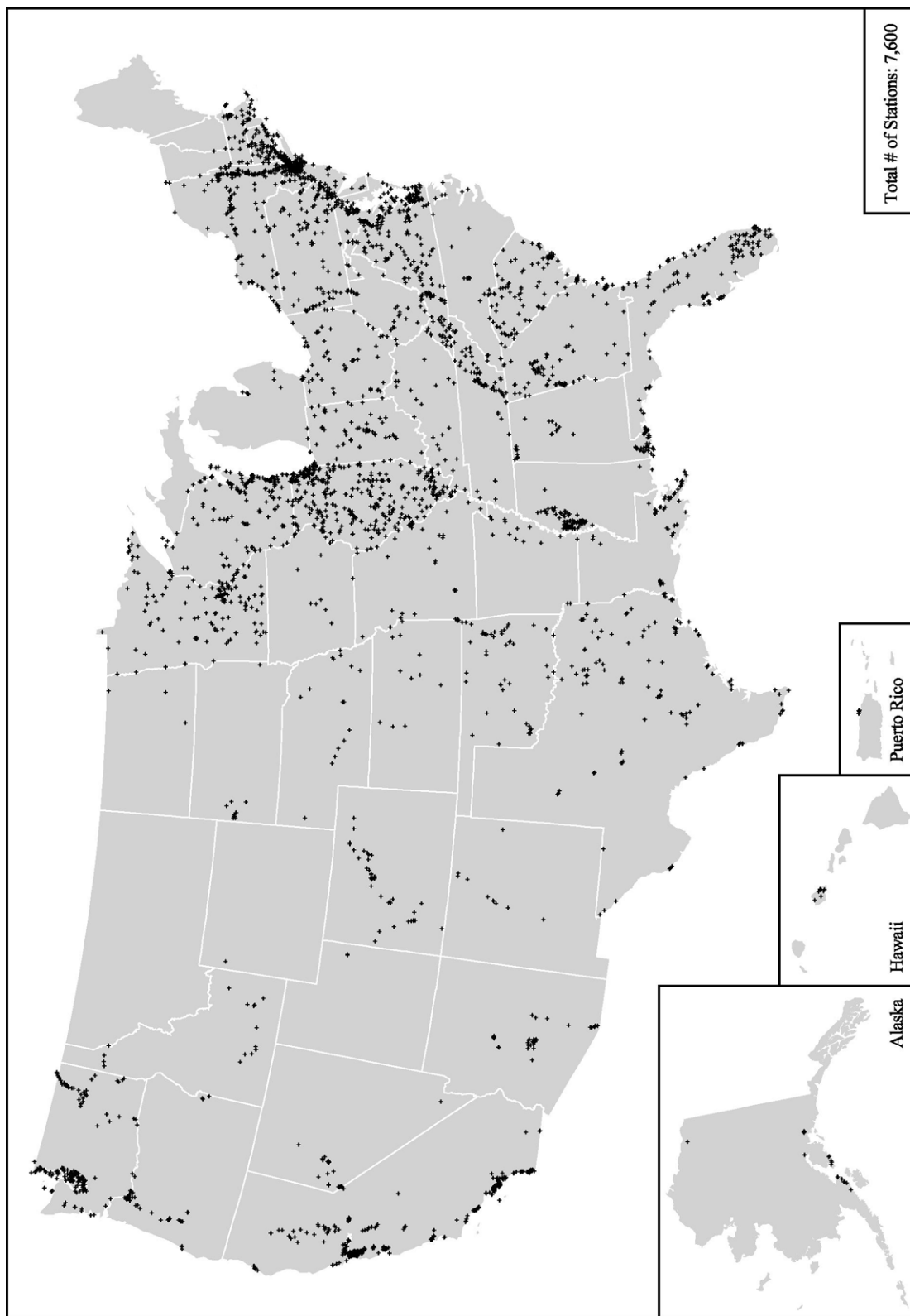| EPA Region (State)	Total Number of Stations Evaluated	Station Evaluation Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	No. of Stations Not Identified by an RF1 Reach[c]	River Reach Evaluation[a] Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	No. of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
Region 1 (CT, ME, MA, NH, RI, VT)	275	155	56.4	90	32.7	30	10.9	28	86	35	4	125	2,764	4.5	4.4
Region 2 (NY, NJ, PR)	1,255	842	67.1	281	22.4	132	10.5	13	199	117	48	364	1,845	19.7	17.1
Region 3 (DE, DC, MD, PA, VA, WV)	2,428	623	25.7	883	36.4	922	38.0	103	344	343	312	999	3,388	29.5	20.3
Region 4 (AL, FL, GA, KY, MS, NC, SC, TN)	2,874	690	24.0	1,031	35.9	1,153	40.1	15	402	454	350	1,206	10,078	12.0	8.5
Region 5 (IL, IN, MI, MN, OH, WI)	3,190	1,122	35.2	1,084	34.0	984	30.9		527	393	329	1,249	6,151	20.3	15.0
Region 6 (AR, LA, NM, OK, TX)	1,489	362	24.3	388	26.1	739	49.6		197	219	321	737	7,577	9.7	5.5
Region 7 (IA, KS, MO, NE)	583	129	22.1	236	40.5	218	37.4		92	157	142	391	4,915	8.0	5.1
Region 8 (CO, MT, ND, SD, UT, WY)	294	74	25.2	99	33.7	121	41.2		52	82	70	204	13,860	1.5	1.0
Region 9 (AZ, CA, HI, NV)	1,752	1,003	57.3	452	25.8	297	17.0	18	153	66	40	259	4,686	5.5	4.7
Region 10 (AK, ID, OR, WA)	5,330	2,600	48.8	1,737	32.6	993	18.6	290	164	126	57	347	10,462	3.3	2.8
Total for U.S.[e]	19,470	7,600	39.0	6,281	32.3	5,589	28.7	467	2,133	1,937	1,625	5,695	64,591	8.8	6.3

[a] River reaches based on EPA River Reach File (RF1).
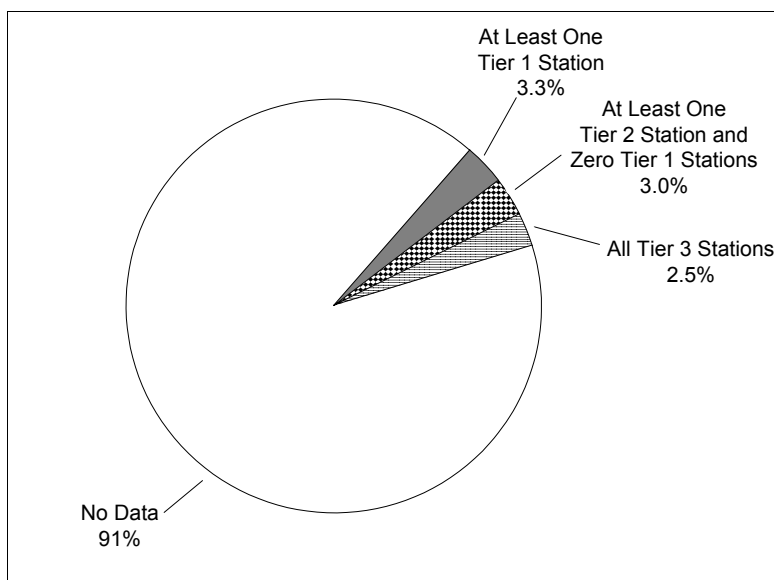[b] Percent of all stations evaluated in the NSI in the region.
[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.
[d] No stations in these reaches were included in Tier 1.
[e] Because some reaches occur in more than one region, the total number of reaches in each category for the country might not equal the sum of reaches in the regions.

Figure 3-2. Sampling Stations Classified as Tier 1 (Associated Adverse Effects Are Probable).

Total # of Stations: 7,600

Alaska   Hawaii

Puerto Rico

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Figure 3-3. National Assessment: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations.

Not all sampling programs target only sites of known or suspected contamination. The NSI database includes data from EPA's Environmental Monitoring and Assessment Program (EMAP), which uses a probabilistic sampling design; that is, the sampling locations are randomly selected. The percentage of sampling stations placed in each tier based on these data alone differs considerably from the percentage of sampling stations in each tier based on an evaluation of all the data in the NSI database. Smaller percentages of EMAP sampling stations are categorized as Tier 1 (26 percent for EMAP compared to 39 percent for all NSI database sampling stations), greater percentages are categorized as Tier 2 (45 percent for EMAP compared to 32 percent for all NSI database stations), and comparable percentages are categorized as Tier 3 (29 percent for both). In comparison, the NSI database also contains data from the National Oceanic and Atmospheric Administration's National Status and Trends Program (NS&T). Although not a probabilistic sampling like EMAP, the NS&T does not target known or suspected contaminated sites. Greater percentages of NS&T sampling stations are categorized as Tier 1 (43 percent for NS&T compared to 39 percent for all NSI database sampling stations), greater percentages are categorized as Tier 2 (42 percent for NS&T compared to 32 percent for all NSI database stations), and smaller percentages are categorized as Tier 3 (16 percent for NS&T compared to 29 percent for all NSI database stations). These differences might also reflect the lower detection limits of more sensitive analytical chemistry techniques, the sensitivity of Tier 2 evaluation parameters, and the nearly ubiquitous presence of low to intermediate levels of contamination in the areas sampled by these programs.

Table 3-2 presents the number of sampling stations, categorized by tier for the different evaluation parameters described in Table 2-2 and organized by aquatic life and human health effects. Most stations (88.8 percent) are evaluated using the logistic regression model. Nearly 75 percent of the stations are evaluated using the sediment-based human health assessment. The draft ESG and draft PAH toxicity unit analyses are applied to 66 and 49 percent of the stations, respectively. The reduced percentages of NSI database stations evaluated with the draft ESG and draft PAH toxicity unit analyses can typically be tied to the absence of analytical results the appropriate organic chemicals which might be typical of monitoring programs that targeted metals or PCBs. Only about 18 percent of the stations were evaluated using sediment toxicity analysis.

Table 3-2. Tier Classification Summary.

Tier Evaluation Parameter	Table 2-2 Evaluation Parameter Reference	Number of Stations			
		Total	Tier 1	Tier 2	Tier 3
Aquatic Life Assessment					
Draft ESG analysis	**1, 7**	12,891	70	230	12,591
SEM analysis	**2, 8**	739	10	205	524
Logistic regression model analysis	**3, 9**	17,283	4,506	6,489	6,288
Draft PAH toxicity unit analysis	**4, 10**	9,621	560	1,163	7,898
Toxicity analysis	**15, 17**	3,446	745	858	1,843
Toxicity demonstrated in two or more species classified as Tier 2	**16**	n/a	54	n/a	n/a
Human Health Assessment					
Sediment chemistry TBP exceeds EPA's human health cancer risk of 10^{-4} or a noncancer hazard quotient (HQ) of 10	**5**	14,594	4,068	n/a	n/a
Sediment chemistry TBP exceeds EPA's human health cancer risk of 10^{-5} or a noncancer HQ of 1, or FDA's Guidance/Action/Tolerance levels	**11**		n/a	3,573	6,953
Tissue levels of chemicals with a log $K_{OW} \geq 5.5$ in samples that exceed EPA's human health cancer risk of 10^{-5}, a noncancer HQ of 1, or FDA's Guidance/ Action/Tolerance levels	**12**	2,367	1,121	n/a	n/a
Tissue levels of chemicals with a log $K_{OW} < 5.5$ in samples that exceed EPA's human health cancer risk of 10^{-5}, a noncancer HQ of 1, or FDA's Guidance/ Action/Tolerance levels	**14**		n/a	472	774
Tissue levels and sediment chemistry TBP of chemicals with a log $K_{OW} < 5.5$ in samples that exceed EPA's human health cancer risk of 10^{-5}, a noncancer HQ of 1, or FDA's Guidance/ Action/Tolerance levels	**6 and 13**	n/a	33	n/a	n/a
Total[a]		19,470	7,600	6,281	5,589

[a] Stations may be evaluated by more than one criterion and hence the sum of the number of stations evaluated under each criterion might not be equal to the total number of stations.

Many of the 19,470 evaluated stations were assessed using more than one of the evaluation parameters. About 35 percent of the stations classified as Tier 1 (2,656 stations) were classified as Tier 1 based on more than one of the evaluation parameters. One-third of the stations classified as Tier 2 (2,090 stations) were classified as Tier 2 based on more than one of the evaluation parameters. Of the remaining 4,944 stations classified as Tier 1 based on only one evaluation parameter, 2,005 stations were classified as Tier 1 based on the logistic regression model, 1,555 stations were classified as Tier 1 based on the sediment chemistry TBP's risk levels, and 1,017 stations were classified as Tier 1 based on tissue risk levels. Of the remaining 4,191 stations classified as Tier 2 based on only one evaluation parameter, 2,804 were classified as Tier 2 based on the logistic regression model and 838 stations were classified as Tier 2 based on the sediment chemistry TBP's exceeding risk levels. Two-thirds of the stations classified as Tier 3 were classified as Tier 3 based on more than one evaluation parameter. Of the remaining 1,892 stations classified as Tier 3 based on only one evaluation parameter, 1,147 were classified as Tier 3 based

on the logistic regression model and 606 stations were classified as Tier 3 based on the sediment chemistry TBP's not exceeding risk levels. Overall, a comparable number of stations were classified as Tier 1 using aquatic life evaluation parameters (4,996 stations) as human health evaluation parameters (5,128 stations). About twice as many stations were classified as Tier 2 using aquatic life evaluation parameters (8,019 stations) as human health evaluation parameters (3,999 stations).

Two important issues in interpreting the results of sampling station classification are naturally occurring "background" levels of chemicals and the effect of chemical mixtures. Site-specific naturally occurring (or background) levels of chemicals may be an important risk management consideration in examining sampling station classification. This is most often an issue for naturally occurring chemicals such as metals and PAHs. In addition, although the sediment chemistry screening levels for individual chemicals are used as indicators of potential adverse biological effects, other co-occurring chemicals (which may or may not be measured) can cause or contribute to any observed adverse effect at specific locations.

To help judge the effectiveness of the NSI data evaluation approach, EPA examined the agreement between sediment chemistry and toxicity test results for the 3,081 NSI database sampling stations where both data types were available and could be evaluated. The toxicity test data indicate whether significant lethality to indicator organisms occurs as a result of exposure to sediment. About two-thirds of the stations classified as Tier 1 based on aquatic life effects from sediment chemistry data were classified as Tier 1 or 2 based on toxicity test results. Forty-three percent of the stations classified as Tier 2 based on aquatic life effects from sediment chemistry data were classified as Tier 1 or 2 based on toxicity test results. Less than one-fourth (23 percent) of the stations classified as Tier 3 based on aquatic life effects from sediment chemistry data were classified as Tier 1 or 2 based on toxicity test results. These results are generally consistent with the range of predicted proportion toxic used to classify a station as Tier 1, 2, or 3. This also demonstrates, in part, the differing sensitivities of varying test organisms and endpoints.

During an initial screening of the NSI data, EPA noted data quality problems that might have affected all or many of the data reported in a given database. The data review process included steps to review the incoming data for consistency. This included confirmation of meta data such as sample date, qualifying codes, chemicals analyzed, and range checks. Typical problems encountered included the reporting of multiple results for a single chemical, inconsistent reporting units, the absence of remark codes, and inconsistencies between tables that reported sample-level information and chemical results. Databases with obvious quality problems were not included in the NSI data evaluation. Also, if a database included in the NSI database did not have associated locational information (latitude/longitude), data in that database were not included in the NSI data evaluation. Other data were organized in a manner that prevented simple electronic manipulation and precluded their use in this assessment.
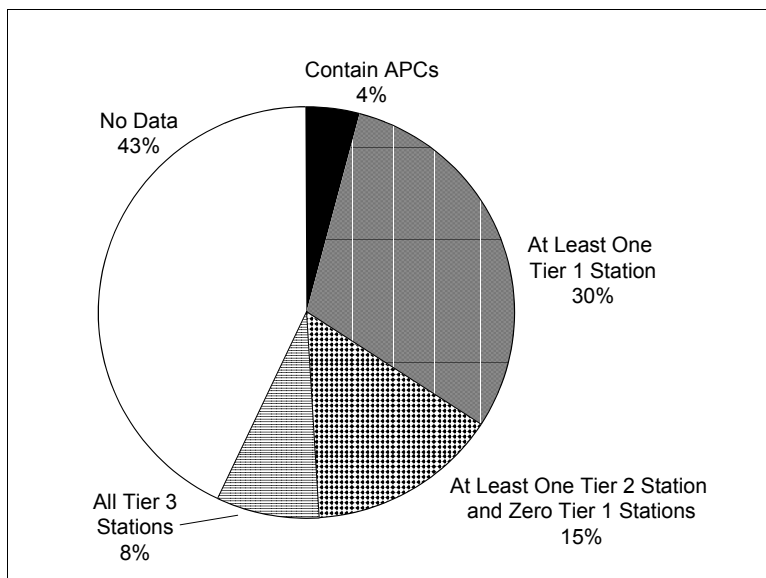
Watershed Assessment

The potential risk of adverse effects to aquatic life and human health is greatest in areas with a multitude of contaminated locations. The assessment of individual sampling stations is useful for estimating the number and distribution of contaminated spots and the overall magnitude of sediment contamination in monitored waterbodies of the United States. However, a single "hot spot" might not pose a great threat to either the benthic community at large or consumers of resident fish because the spatial extent of exposure could be small. On the other hand, if many contaminated spots are located in close proximity, the spatial extent and probability of exposure are much greater. EPA examined sampling station classifications within watersheds to identify areas of probable concern for sediment contamination (APCs), where the exposure of benthic organisms and resident fish to contaminated sediment might be likely. In this report, EPA defines watersheds by 8-digit United States Geological Survey (USGS) hydrologic unit codes (cataloging units), which are roughly the size of a county. In the contiguous United States there are 2,111 watersheds.

Watersheds containing APCs are those which include at least 10 Tier 1 sampling stations and in which at least 75 percent of all sampling stations were classified as either Tier 1 or Tier 2. The definition of an APC requires that a watershed include at least 10 sampling stations because at least 10 must be classified as Tier 1. About 18 percent of the watersheds in the country (370 of 2,111) met this requirement and thus were eligible to contain an APC. These dual criteria were based on empirical observation of the data in the first *National Sediment Quality Survey* report to Congress and are maintained for this evaluation. The definition of "area of probable concern" was developed to identify watersheds for which further study of the effects and sources of sediment contamination, and possible risk reduction needs, would be warranted. Where data have been generated through intensive sampling in areas of known or suspected contamination in a watershed, the APC definition should identify watersheds that contain even relatively small areas that are considerably contaminated. However, this designation does not imply that sediment throughout the entire watershed, which is typically very large compared to the extent of available sampling data, is contaminated. On the other hand, where data have been generated through comprehensive sampling, or where sampling stations were selected randomly or evenly distributed throughout a sampling grid, the APC definition might not identify watersheds that contain small or sporadically contaminated areas. A comprehensively surveyed watershed of the size typically delineated by a USGS cataloging unit might contain small but significant areas that are considerably contaminated but might be too large in total area for 75 percent of all sampling stations to be classified as Tier 1 or Tier 2. Limited random or evenly distributed sampling within such a watershed also might not yield 10 Tier 1 sampling stations. Thus, the process used to identify watersheds containing APCs might include some watersheds with limited areas of contamination and omit some watersheds with significant contamination. However, given available data, EPA believes the process represents a reasonable screening analysis to identify watersheds where further study is warranted.

NSI database sampling stations are located in 1,202 watersheds, or approximately 57 percent of the total number of watersheds in the contiguous United States. The application of the above procedure identified 88 watersheds that contain APCs. These watersheds represent about 4 percent of all watersheds in the contiguous United States (88 of 2,111). The watershed analysis also indicated that 30 percent of all watersheds in the contiguous United States contain at least one Tier 1 sampling station, 15 percent contain at least one Tier 2 sampling station but no Tier 1 stations, and 8 percent contain all Tier 3 sampling stations (Figure 3-4). Forty-three percent of all watersheds in the country did not include a sampling station. Table 3-3 contains a list of all watersheds that contain an APC. The location of these watersheds is depicted on Figure 3-5. The name and cataloging unit number on Table 3-3 correspond to the labels on Figure 3-5.

Of the 370 watersheds with enough stations to potentially contain an APC, approximately 24 percent (88 of 370) of these watersheds contained an APC. To some extent, the sampling effort does contribute to the number of Tier 1 stations. A simple statistical regression analysis of total number of sampling stations versus number of Tier 1 sampling stations for the 370 watersheds eligible to contain an APC (including at least 10 and up to 200 sampling stations) resulted in a statistically significant correlation coefficient (R-square) of 0.63. However, when a regression analysis of total number of sampling stations versus percentage of Tier 1 and Tier 2 stations is performed, the resulting correlation coefficient is 0.02, which indicates no correlation. As a result, the sampling effort does not overly contribute to APC identification because of the dual criteria. Of the 88 watersheds, 54 watersheds would have been identified as containing an APC if only aquatic life criteria were evaluated. Forty-three of the 88 watersheds containing an APC would have been identified if only human health criteria were used. Twenty-nine of these watersheds are in common. Twenty of the 88 watersheds would not have been identified at all.

Figure 3-4. National Assessment: Watershed Classifications.

APC designation could result from extensive sampling throughout a watershed or from intensive sampling at a single contaminated locations or a few such locations. In comparison to the overall results presented in Figure 3-3, sampling stations are located on an average of 34 percent of the reaches in watersheds containing APCs. On the average, 23 percent of reaches in watersheds containing APCs have at least one Tier 1 sampling station and 8 percent have no Tier 1 sampling station but at least one Tier 2 sampling station. In many of these watersheds, contaminated areas may be concentrated in specific river reaches in a watershed. Within the 88 watersheds containing APCs across the country, 86 individual river reaches or waterbody segments have 10 or more Tier 1 sampling stations (Table 3-4). These are localized areas in the watershed for which an abundance of evidence indicates potentially severe contamination. Because EPA's Reach File 1 was used to index the location of NSI database sampling stations, some sampling stations might not actually occur on the identified Reach File 1 stream, but on a smaller stream that is hydrologically linked or is relatively close to the Reach File1 stream.

The first report to Congress (USEPA, 1997) identified 96 watersheds with APCs based on data collected from 1980 through 1993. Using the updated methodology described in Chapter 2 and the same APC definition, the current analysis resulted in 88 watersheds containing an APC based on data collected from 1990 through 1999. Table 3-5 summarizes the watershed results between the two analyses. Thirty-six watersheds were identified in both reports as containing an APC. Of the remaining 60 (96 - 36) watersheds with an APC in the previous report to Congress, 26 of the watersheds had fewer than 10 total monitoring stations with data evaluated, 26 watersheds had fewer than 10 Tier 1 stations, and eight watersheds had less than 75 percent of the analyzed stations classified as Tier 1 or Tier 2 in the current analysis. Of the remaining 52 (88 - 36) watersheds with an APC in the current analysis, 17 of the watersheds had fewer than 10 total monitoring stations with data evaluated, 30 watersheds had fewer than 10 Tier 1 stations, and five watersheds had less than 75 percent of the analyzed stations classified as Tier 1 or Tier 2 in the previous report to Congress. Therefore, it should not be inferred that there are no ecological or human health impacts due to contaminated sediments for the stations located in watersheds that were designated as APCs in the first report that are not designated as such in this first update. Additional analysis should be conducted to determine the degree of impact due to contaminated sediments.

Table 3-3. USGS Cataloging Unit Number and Names for Watersheds Containing APCs.

Map No.	Cataloging Unit Number	Cataloging Unit Name	Map No.	Cataloging Unit Number	Cataloging Unit Name
1	01080205	Lower Connecticut	45	07120002	Iroquois
2	01090001	Charles	46	07120003	Chicago
3	01090004	Narragansett	47	07120004	Des Plaines
4	01100005	Housatonic	48	07120005	Upper Illinois
5	01100006	Saugatuck	49	07120006	Upper Fox
6	01100007	Long Island Sound	50	07130001	Lower Illinois-Senachwine Lake
7	02020003	Hudson-Hoosic	51	07130003	Lower Illinois-Lake Chautauqua
8	02020004	Mohawk	52	07130007	South Fork Sangamon
9	02020006	Middle Hudson	53	07130011	Lower Illinois
10	02020008	Hudson-Wappinger	54	07130012	Macoupin
11	02030101	Lower Hudson	55	08030207	Big Sunflower
12	02030102	Bronx	56	08030209	Deer-Steele
13	02030103	Hackensack-Passaic	57	08090100	Lower Mississippi-New Orleans
14	02030104	Sandy Hook-Staten Island	58	11070209	Lower Neosho
15	02030105	Raritan	59	12030102	Lower West Fork Trinity
16	02030201	Northern Long Island	60	12090205	Austin-Travis Lakes
17	02030202	Southern Long Island	61	14010002	Blue
18	02040202	Lower Delaware	62	15060106	Lower Salt
19	02040205	Brandywine-Christina	63	16050203	Carson Desert
20	02060003	Gunpowder-Patapsco	64	17020001	Franklin D. Roosevelt Lake
21	02060004	Severn	65	17080001	Lower Columbia-Sandy
22	03050202	South Carolina Coastal	66	17090012	Lower Willamette
23	03060109	Lower Savannah	67	17100102	Queets-Quinault
24	03070203	Cumberland-St. Simons	68	17100105	Grays Harbor
25	03100206	Tampa Bay	69	17110002	Strait of Georgia
26	03130002	Middle Chattahoochee-Lake Harding	70	17110012	Lake Washington
27	03140105	Pensacola Bay	71	17110013	Duwamish
28	03160205	Mobile Bay	72	17110019	Puget Sound
29	04030101	Manitowoc-Sheboygan	73	18010102	Mad-Redwood
30	04030108	Menominee	74	18020112	Sacramento-Upper Clear
31	04030204	Lower Fox	75	18040005	Lower Cosumnes-Lower Mokelumne
32	04040001	Little Calumet-Galien	76	18050001	Suisun Bay
33	04040002	Pike-Root	77	18050002	San Pablo Bay
34	04120101	Chautauqua-Conneaut	78	18050003	Coyote
35	05060001	Upper Scioto	79	18050004	San Francisco Bay
36	05120106	Tippecanoe	80	18060006	Central Coastal
37	05120201	Upper White	81	18060011	Alisal-Elkhorn Sloughs
38	06010201	Watts Bar Lake	82	18070103	Calleguas
39	06010205	Upper Clinch	83	18070104	Santa Monica Bay
40	06020001	Middle Tennessee-Chickamauga	84	18070106	San Gabriel
41	07040001	Rush-Vermillion	85	18070201	Seal Beach
42	07080101	Copperas-Duck	86	18070203	Santa Ana
43	07090007	Green	87	18070301	Aliso-San Onofre
44	07120001	Kankakee	88	18070304	San Diego

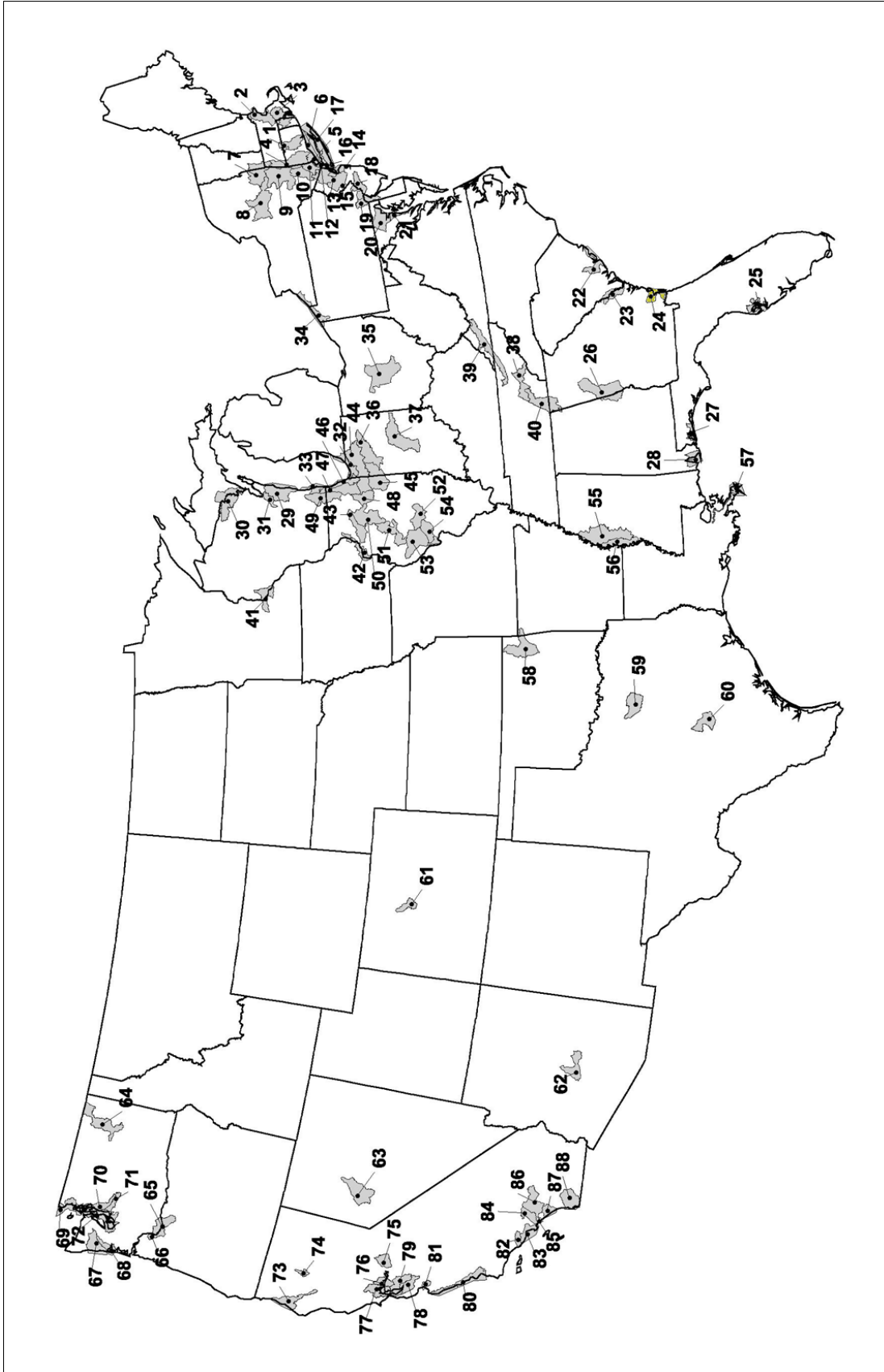**DRAFT - Do not cite, quote, or distribute** **December, 2001**

Figure 3-5. Watersheds Identified as Containing APCs.

Table 3-4. River Reaches with 10 or More Tier 1 Sampling Stations Located in Watersheds Containing APCs.

Cataloging Unit Number	Cataloging Unit Name	RF1 Reach ID	RF1 Reach Name	Number of Tier 1 Stations	Total Number of Stations in Reach
01090001	Charles	01090001022	Boston Bay	16	32
02020003	Hudson-Hoosic	02020003031	Hudson River	16	16
		02020003056	Hudson River	16	16
		02020003057	Hudson River	29	33
		02020003078	Hudson River	67	67
02020008	Hudson-Wappinger	02020008031	Hudson River	12	12
02030101	Lower Hudson	02030101009	Hudson River	10	10
		02030101039	Hudson River	11	11
02030102	Bronx	02030102001	Long Island Sound	22	27
02030103	Hackensack-Passaic	02030103001	Hackensack River	16	21
		02030103010	Passaic River	105	106
		02030103023	Rockaway River	11	19
02030104	Sandy Hook-Staten Island	02030104001	Upper New York Bay	35	39
		02030104002	Newark Bay	61	74
		02030104004	Staten Island	22	29
02030201	Northern Long Island	02030201003	Long Island Sound	17	17
02030202	Southern Long Island	02030202028	Jamaica Bay	25	41
02040205	Brandywine-Christina	02040205011	Christina River	74	147
		02040205013	Red Clay Creek	11	15
03050202	South Carolina Coastal	03050202010	Ashley River	15	25
03070203	Cumberland-St. Simons	03070203004	Turtle River	11	12
03100206	Tampa Bay	03100206009	Hillsborough Bay	26	34
03140105	Pensacola Bay	03140105011	Pensacola Bay	14	27
04030101	Manitowoc-Sheboygan	04030101020	Sheboygan River	80	94
		04030101021	Sheboygan River	25	46
		04030101022	Sheboygan River	12	34
04030108	Menominee	04030108001	Menominee River	12	12
04040002	Pike-Root	04040002002	Lake Michigan	33	46
07080101	Copperas-Duck	07080101008	Mississippi River	46	58
		07080101009	Mississippi River	12	19
		07080101020	Duck Creek	14	17
07120003	Chicago	07120003001	Chicago Sanitary Ship Canal	12	20
07120004	Des Plaines	07120004011	Des Plains River	13	23
		07120004016	Salt Creek	12	16
07120006	Upper Fox	07120006011	Fox River	10	14

Table 3-4. (Continued)

Cataloging Unit Number	Cataloging Unit Name	RF1 Reach ID	RF1 Reach Name	Number of Tier 1 Stations	Total Number of Stations in Reach
08030207	Big Sunflower	08030207005	Big Sunflower River	12	14
08030209	Deer-Steele	08030209003	Black Bayou	11	19
08090100	Lower Mississippi-New Orleans	08090100004	Mississippi River	15	18
12090205	Austin-Travis Lakes	12090205004	Colorado River	13	13
15060106	Lower Salt	15060106001	Salt River	11	28
		15060106026	Cave Creek	17	24
17080001	Lower Columbia-Sandy	17080001009	Columbia River	12	49
17090012	Lower Willamette	17090012017	Willamette River	44	97
		17090012018	Willamette River	24	49
		17090012019	Willamette River	130	197
		17090012026	Columbia Slough	12	26
17100102	Queets-Quinault	17100102040	Matheny Creek	49	74
		17100102042	Sams River	26	34
17100105	Grays Harbor	17100105022	Big Creek	83	86
		17100105025	Humptulips River, East Fork	13	14
17110002	Strait of Georgia	17110002019	Bellingham Bay	66	105
		17110002022	Bellingham Bay	57	114
		17110002030	Strait of Georgia	17	77
17110012	Lake Washington	17110012001	Lake Washington Ship Canal	69	74
		17110012003	Lake Union	58	59
		17110012004	Lake Union	14	14
		17110012009	Lake Washington	20	45
17110013	Duwamish	17110013001	Duwamish Waterway	70	130
		17110013003	Elliot Bay	485	745
		17110013005	Green River	12	15
17110019	Puget Sound	17110019022	Sinclair Inlet	164	192
		17110019068	Budd Inlet	52	161
		17110019081	Puget Sound	19	20
		17110019084	Puget Sound	19	45
		17110019085	Puget Sound	524	848
		17110019086	Puget Sound	166	257
		17110019087	Puget Sound	65	231
18010102	Mad-Redwood	18010102010	Arcata Bay	12	15
18040005	Lower Cosumnes-Lower Mokelumne	18040005005	Comanche Reservoir	15	36

Table 3-4. (Continued)

Cataloging Unit Number	Cataloging Unit Name	RF1 Reach ID	RF1 Reach Name	Number of Tier 1 Stations	Total Number of Stations in Reach
18050002	San Pablo Bay	18050002002	San Pablo Bay	28	29
		18050002036	San Pablo Bay	12	20
18050004	San Francisco Bay	18050004001	San Francisco Bay	58	66
		18050004038	San Francisco Bay	10	14
		18050004049	San Francisco Bay	33	35
18060006	Central Coastal	18060006015	Charro Creek	19	20
18070103	Calleguas	18070103009	Pacific Ocean	17	18
18070104	Santa Monica Bay	18070104001	Pacific Ocean	46	62
		18070104002	Pacific Ocean	13	13
		18070104003	Pacific Ocean	34	46
		18070104005	Pacific Ocean	10	10
18070106	San Gabriel	18070106021	Pacific Ocean	16	26
18070201	Seal Beach	18070201001	Pacific Ocean	36	59
18070203	Santa Ana	18070203001	Santa Ana River	39	85
18070304	San Diego	18070304001	Pacific Ocean	39	49
		18070304008	San Diego Bay	12	19
		18070304014	San Diego Bay	138	169

Table 3-5. Watersheds with APCs: Comparison of Previous Report to Congress and Current Analysis.

Watershed Result in Other Report	Watershed Contained an APC Based on Data Evaluated in the Previous Report to Congress	Watershed Contains an APC Based on the Current Analysis
Identified as APC	36	36
Had fewer than 10 total monitoring stations	26	17
Had 10 or more total stations, but fewer than 10 stations were classified as Tier 1	26	30
Had 10 or more stations classified as Tier 1, but less than 75 percent of all stations were classified as Tier 1 or Tier 2	8	5
Total Watersheds Containing an APC	**96**	**88**

Regional and State Assessment

The remainder of this chapter presents more detailed results from the evaluation of NSI data for sampling stations located in each of the EPA regions and each state. The sections that follow present the number of Tier 1, Tier 2, and Tier 3 sampling stations in each region and state. Tables and figures similar to those presented in the national assessment of sampling station evaluation results and river reach evaluation results are included. Regional maps display the location of Tier 1 and Tier 2 sampling stations and APCs. The presentation format is identical for all regions.

These summary results do not include locations with contaminated sediment not identified in the NSI database. The data compiled for the NSI database are primarily from large national electronic databases. Data from many sampling and testing studies have not yet been incorporated into the NSI database. Thus, it is likely that additional locations with sediment contamination do not appear in this summary. On the other hand, data in this evaluation were collected between 1990 and 1999 and any single measurement of a chemical at a sampling station taken at any point in time during that period could result in classification of the sampling station in Tier 1 or Tier 2. Because the evaluation is a screening-level analysis, sampling stations that appear in Tier 1 or Tier 2 might not actually cause unacceptable impacts. In addition, management programs to address identified sediment contamination might already exist.

It is important to repeat here that some regions and states, as demonstrated in Table 2-1, have significantly more evaluated data than do most other regions and states. This situation would, to some degree, account for the relatively large number of sampling stations classified as Tier 1 in some regions and states.

EPA Region 1

Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

EPA evaluated 275 sampling stations in Region 1 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 100 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 127 stations, placing them in Tier 2. For human health, data for 116 sampling stations indicated probable association with adverse effects (Tier 1), and 60 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 155 sampling stations (57 percent) as Tier 1, 90 (33 percent) as Tier 2, and 30 (11 percent) as Tier 3. The NSI database sampling stations in Region 1 were located in 125 separate river reaches, or 4.5 percent of all reaches in the region. Three percent of all river reaches in Region 1 included at least one Tier 1 station, 1.3 percent included at least one Tier 2 station but no Tier 1 stations, and 0.1 percent had only Tier 3 stations (Table 3-6). Table 3-7 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 8 watersheds containing APCs out of the 61 watersheds (13 percent) in Region 1 (Table 3-6). In addition, 20 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 12 percent had at least one Tier 2 station but no Tier 1 stations, and 0 percent had only Tier 3 stations; 56 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 1 are illustrated in Figure 3-6.

Within the 8 watersheds in Region 1 identified as containing APCs (Table 3-8), 29 waterbodies have at least 1 Tier 1 sampling station and 4 waterbodies have 10 or more Tier 1 sampling stations (Table 3-9). For those watersheds that contain APCs, Table 3-9 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-9, Boston Bay, Long Island Sound, the Connecticut River, and the Housatonic River appear to have the most significant sediment contamination in Region 1.

Table 3-6. Region 1: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	2,764	Total Number of Watersheds	61
River Reaches with at Least One Tier 1 Station	86 (3.1%)	Watersheds Containing APCs	8 (13.1%)
		Watersheds with at Least One Tier 1 Station	12 (19.7%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	35 (1.3%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	7 (11.5%)
River Reaches with All Tier 3 Stations	4 (0.1%)	Watersheds with All Tier 3 Stations	0 (0%)
River Reaches with No Data	2,639 (95.5%)	Watersheds with No Data	34 (55.7%)

Table 3-7. Region 1: Evaluation Results for Sampling Stations and River Reaches by State.

State	Total Number of Stations Evaluated	Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number. of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
				Station Evaluation							River Reach Evaluation[a]				
Connecticut	121	80	66.1	37	30.6	4	3.3	28	50	13	1	64	215	29.8	29.3
Maine	-	-	-	-	-	-	-	-	-	-	-	-	1,675	-	-
Massachusetts	127	63	49.6	39	30.7	25	19.7	-	31	14	2	47	270	17.4	16.7
New Hampshire	4	2	50.0	2	50.0	-	-	-	2	4	-	6	283	2.1	2.1
Rhode Island	18	10	55.6	7	38.9	1	5.6	-	8	4	1	13	56	23.2	21.4
Vermont	5	-	-	5	100.0	-	-	-	5	6	-	11	375	2.9	2.9
Region 1[e]	275	155	56.4	90	32.7	30	10.9	28	86	35	4	125	2,764	4.5	4.4

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
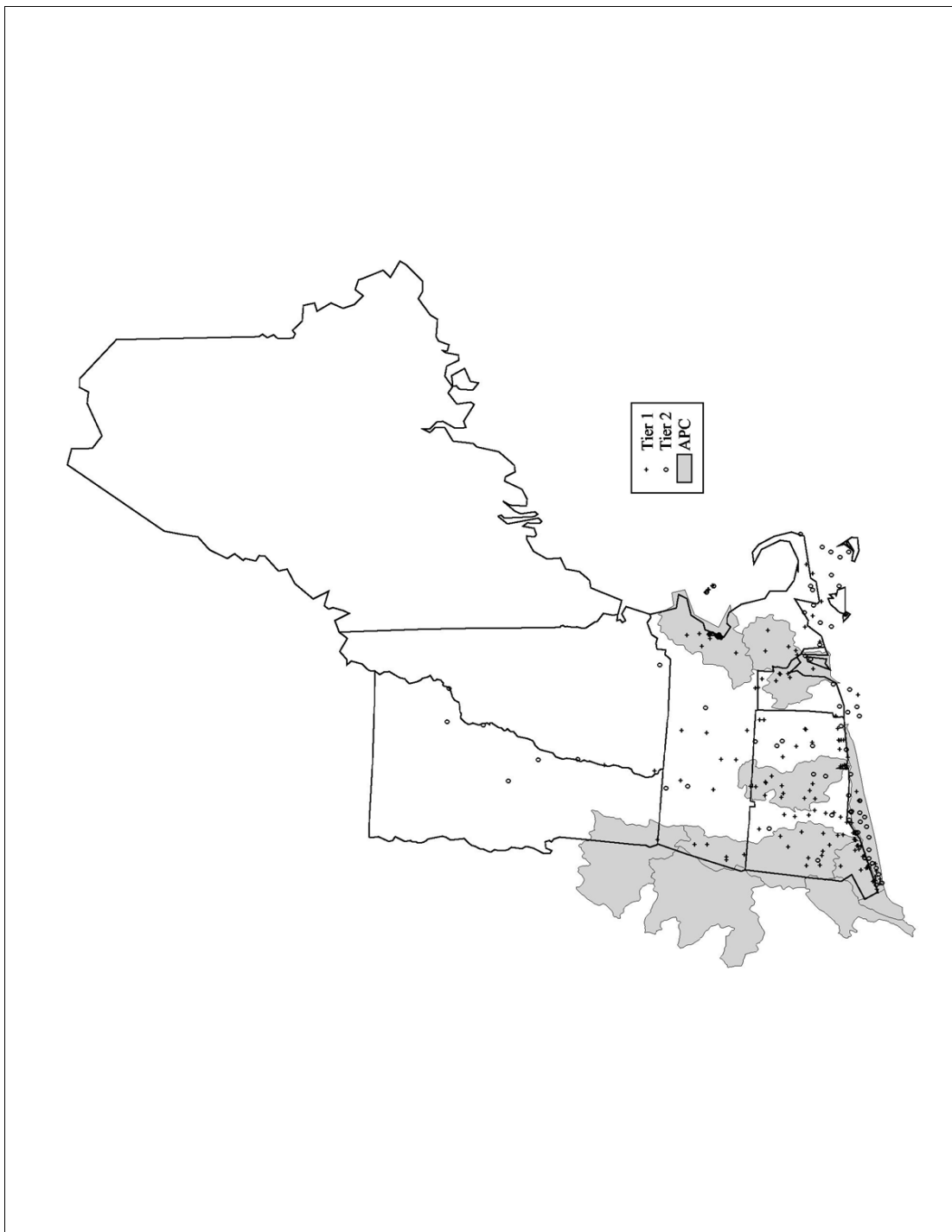
Figure 3-6. Region 1: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Tier 1
Tier 2
APC

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Table 3-8. Region 1: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
01080205	Lower Connecticut	CT, MA	19	17	2	0	100
01090001	Charles	MA	69	37	21	11	84
01090004	Narragansett	MA, RI	14	11	2	1	93
01100005	Housatonic	CT, MA, NY	24	21	1	2	92
01100006	Saugatuck	CT, (NY)	19	16	3	0	100
01100007	Long Island Sound	CT, NY	31	10	19	2	94
02020003	Hudson-Hoosic	NY, MA, (VT)	163	155	7	1	99
02030202	Southern Long Island	NY, CT, NJ	85	40	27	18	79

[a]No data were available for states listed in parentheses.

Table 3-9. Region 1: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Boston Bay	23	Bantam River	1
Long Island Sound	13	Conanicut Island	1
Connecticut River	11	Green River	1
Housatonic River	10	Hoosic River	1
Atlantic Ocean	7	Ipswich River	1
Boston Harbor And Mystic River Area	4	Konkapot River	1
Naugatuck River	4	Mattabesset River	1
Taunton River	3	Neponset River	1
Woonasquatucket River	3	Norwalk River	1
Hockanum River	2	Rippowan River	1
Narragansett Bay	2	Saugatuck Reservoir	1
Pawtuxet River	2	Saugus River	1
Scanite River	2	Shepaug River	1
Coginchaug River	1	Windsor Brook	1
Still River	1		

EPA Region 2

New Jersey, New York, Puerto Rico

EPA evaluated 1,255 sampling stations in Region 2 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 523 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 350 stations, placing them in Tier 2. For human health, data for 732 sampling stations indicated probable association with adverse effects (Tier 1), and 259 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 842 sampling stations (67 percent) as Tier 1, 281 (22 percent) as Tier 2, and 132 (11 percent) as Tier 3. The NSI database sampling stations in Region 2 were located in 364 separate river reaches, or 19.7 percent of all reaches in the region. Eleven percent of all river reaches in Region 2 included at least one Tier 1 station, 6.3 percent included at least one Tier 2 station but no Tier 1 stations, and 2.6 percent had only Tier 3 stations (Table 3-10). Table 3-11 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 16 watersheds containing APCs out of the 63 watersheds (25 percent) in Region 2 (Table 3-10). In addition, 54 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 6.3 percent had at least one Tier 2 station but no Tier 1 stations, and 4.8 percent had only Tier 3 stations; 10 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 2 are illustrated in Figure 3-7.

Within the 16 watersheds in Region identified as containing APCs (Table 3-12), 67 waterbodies have at least 1 Tier 1 sampling station and 12 waterbodies have 10 or more Tier 1 sampling stations (Table 3-13). For those watersheds that contain APCs, Table 3-13 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-13, Hudson River, Passaic River, Newark Bay, Long Island Sound, Upper New York Bay, Jamaica Bay, Staten Island, Atlantic Ocean, Hackensack River, Sandy Hook Bay, and Mohawk River appear to have the most significant sediment contamination in Region 2.

Table 3-10. Region 2: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	1,845	Total Number of Watersheds	63
River Reaches with at Least One Tier 1 Station	199 (10.8%)	Watersheds Containing APCs	16 (25.4%)
		Watersheds with at Least One Tier 1 Station	34 (54%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	117 (6.3%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	4 (6.3%)
River Reaches with All Tier 3 Stations	48 (2.6%)	Watersheds with all Tier 3 Stations	3 (4.8%)
River Reaches with No Data	1,481 (80.3%)	Watersheds with No Data	6 (9.5%)

Table 3-11. Region 2: Evaluation Results for Sampling Stations and River Reaches by State.

State	Total Number of Stations Evaluated	Tier 1 #	Tier 1 %[b]	Tier 2 #	Tier 2 %[b]	Tier 3 #	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
New Jersey	492	332	67.5	113	23.0	47	9.6	-	59	51	18	128	304	42.1	36.2
New York	753	506	67.2	162	21.5	85	11.3	3	150	67	30	247	1,562	15.8	13.9
Puerto Rico	10	4	40.0	6	60.0	-	-	10	-	-	-	-	-	-	-
U.S. Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Region 2[e]	1,255	842	67.1	281	22.4	132	10.5	13	199	117	48	364	1,845	19.7	17.1

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
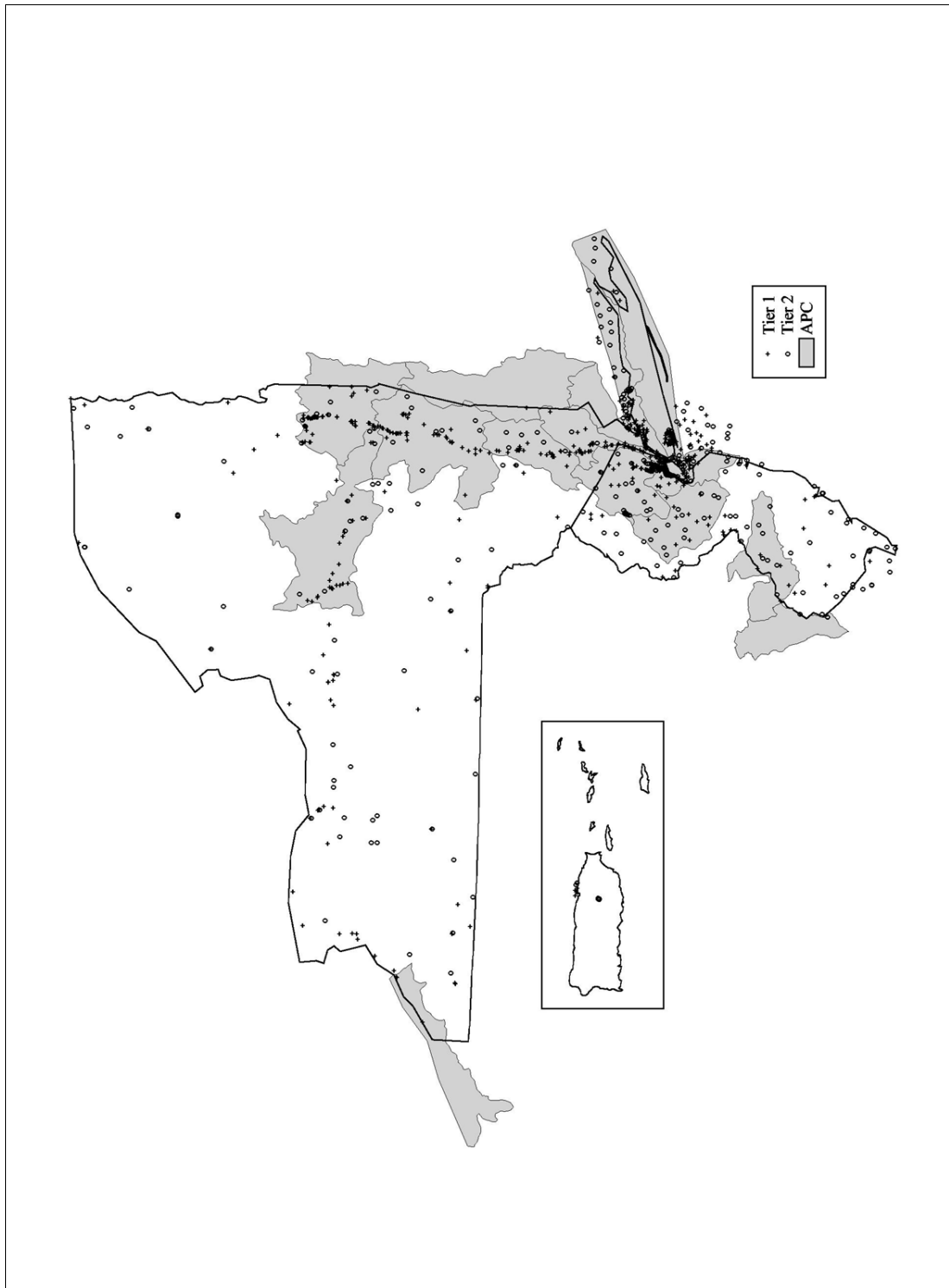
Figure 3-7. Region 2: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watershed Containing APCs.

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Table 3-12. Region 2: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
01100005	Housatonic	CT, MA, NY	24	21	1	2	92
01100007	Long Island Sound	CT, NY	31	10	19	2	94
02020003	Hudson-Hoosic	NY, MA, (VT)	163	155	7	1	99
02020004	Mohawk	NY	43	28	10	5	88
02020006	Middle Hudson	NY, (MA)	76	57	9	10	87
02020008	Hudson-Wappinger	NY	40	34	6	0	100
02030101	Lower Hudson	NJ, NY, (CT)	68	60	2	6	91
02030102	Bronx	NY	27	22	4	1	96
02030103	Hackensack-Passaic	NJ, NY	172	147	21	4	98
02030104	Sandy Hook-Staten Island	NJ, NY	194	151	36	7	96
02030105	Raritan	NJ	30	13	13	4	87
02030201	Northern Long Island	NY	75	42	28	5	93
02030202	Southern Long Island	NY, CT, NJ	85	40	27	18	79
02040202	Lower Delaware	NJ, PA	26	10	15	1	96
02040205	Brandywine-Christina	DE, MD, NJ, (PA)	220	110	62	48	78
04120101	Chautauqua-Conneaut	NY, OH, PA	16	13	1	2	88

[a]No data were available for states listed in parentheses.

Table 3-13. Region 2: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Hudson River	266	Beden Brook	1
Passaic River	112	Big Timber Creek, South Fork	1
Newark Bay	61	Black Creek	1
Long Island Sound	54	Canajoharie Creek	1
Upper New York Bay	35	Canopus Creek	1
Jamaica Bay	25	Cayadutta Creek	1
Staten Island	22	Claverack Creek	1
Atlantic Ocean	16	Cranbury Brook	1
Hackensack River	16	E Canada Creek	1
Sandy Hook Bay	12	East Bay	1
Rockaway River	11	Great Peconic Bay	1

Table 3-13. Region 2: (Continued)

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Mohawk River	11	Hohohus Brook	1
East River	9	Lake Erie, U.S. Shore	1
Sauquoit Creek	9	Lisha Kill	1
Upper Bay	9	Little Peconic Bay	1
Valatie Kill	8	Manalapan Brook	1
Arthur Kill	6	Millstone River	1
Rahway River	5	Neshanic River	1
Lower Bay	4	Onesquethaw Creek	1
Ninemile Creek	4	Pennsauken Creek	1
Delaware River	3	Pompton Creek	1
Hoosic River	3	Ramapo River	1
Raritan River	3	Raritan River, North Brook	1
Saddle River	3	Raritan River, South Brook	1
Batten Kill	2	Repaupo Creek	1
Croton River	2	Silver Creek	1
Esopus Creek	2	Smithtown Bay	1
Green Brook	2	Stony Brook	1
Normans Kill	2	Swamp River	1
Raritan Bay	2	Walnut Creek	1
Vloman Kill	2	Wanaque Reservoir	1
Walloomsac River	2	Wappinger Creek	1
Amawalk Reservoir	1	Whippany River	1
		Woodbury Creek	1

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EPA Region 3

Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia

EPA evaluated 2,428 sampling stations in Region 3 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 406 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 850 stations, placing them in Tier 2. For human health, data for 331 sampling stations indicated probable association with adverse effects (Tier 1), and 402 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 623 sampling stations (26 percent) as Tier 1, 883 (36 percent) as Tier 2, and 922 (38 percent) as Tier 3. The NSI database sampling stations in Region 3 were located in 999 separate river reaches, or 29.5 percent of all reaches in the region. Ten percent of all river reaches in Region 3 included at least one Tier 1 station, 10.1 percent included at least one Tier 2 station but no Tier 1 stations, and 9.2 percent had only Tier 3 stations (Table 3-14). Table 3-15 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 6 watersheds containing areas of APCs out of the 128 watersheds (5 percent) in Region 3 (Table 3-14). In addition, 72 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 9.4 percent had at least one Tier 2 station but no Tier 1 stations, and 3.1 percent had only Tier 3 stations; 11 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 3 are illustrated in Figure 3-8.

Within the 6 watersheds in Region 3 identified as containing APCs (Table 3-16), 22 waterbodies have at least 1 Tier 1 sampling station; 6 waterbodies have 10 or more Tier 1 sampling stations (Table 3-17). For those watersheds that contain APCs, Table 3-17 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-17, Christina River, Severn River, Curtis Bay, Red Clay Creek, South River, and Lake Erie shoreline appear to have the most significant sediment contamination in Region 3.

Table 3-14. Region 3: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	3,388	Total Number of Watersheds	128
River Reaches with at Least One Tier 1 Station	344 (10.2%)	Watersheds Containing APCs	6 (4.7%)
		Watersheds with at Least One Tier 1 Station	92 (71.9%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	343 (10.1%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	12 (9.4%)
River Reaches with All Tier 3 Stations	312 (9.2%)	Watersheds with All Tier 3 Stations	4 (3.1%)
River Reaches with No Data	2,389 (70.5%)	Watersheds with No Data	14 (10.9%)

Table 3-15. Region 3: Evaluation Results for Sampling Stations and River Reaches by State.

| State	Total Number of Stations Evaluated	Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
		Station Evaluation						**River Reach Evaluation[a]**							
Delaware	234	112	47.9	69	29.5	53	22.7	-	12	16	4	32	91	35.2	30.8
District of Columbia	6	2	33.3	3	50.0	1	16.7	-	5	3	-	8	16	50.0	50.0
Maryland	290	89	30.7	144	49.7	57	19.7	44	47	61	20	128	440	29.1	24.6
Pennsylvania	216	115	53.2	48	22.2	53	24.5	-	89	26	25	140	710	19.7	16.2
Virginia	1,577	269	17.1	591	37.5	717	45.5	59	184	242	257	683	1,330	51.4	32.0
West Virginia	105	36	34.3	28	26.7	41	39.1	-	44	28	14	86	1,000	8.6	7.2
Region 3[e]	2,428	623	25.7	883	36.4	922	38.0	103	344	343	312	999	3,388	29.5	20.3

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.

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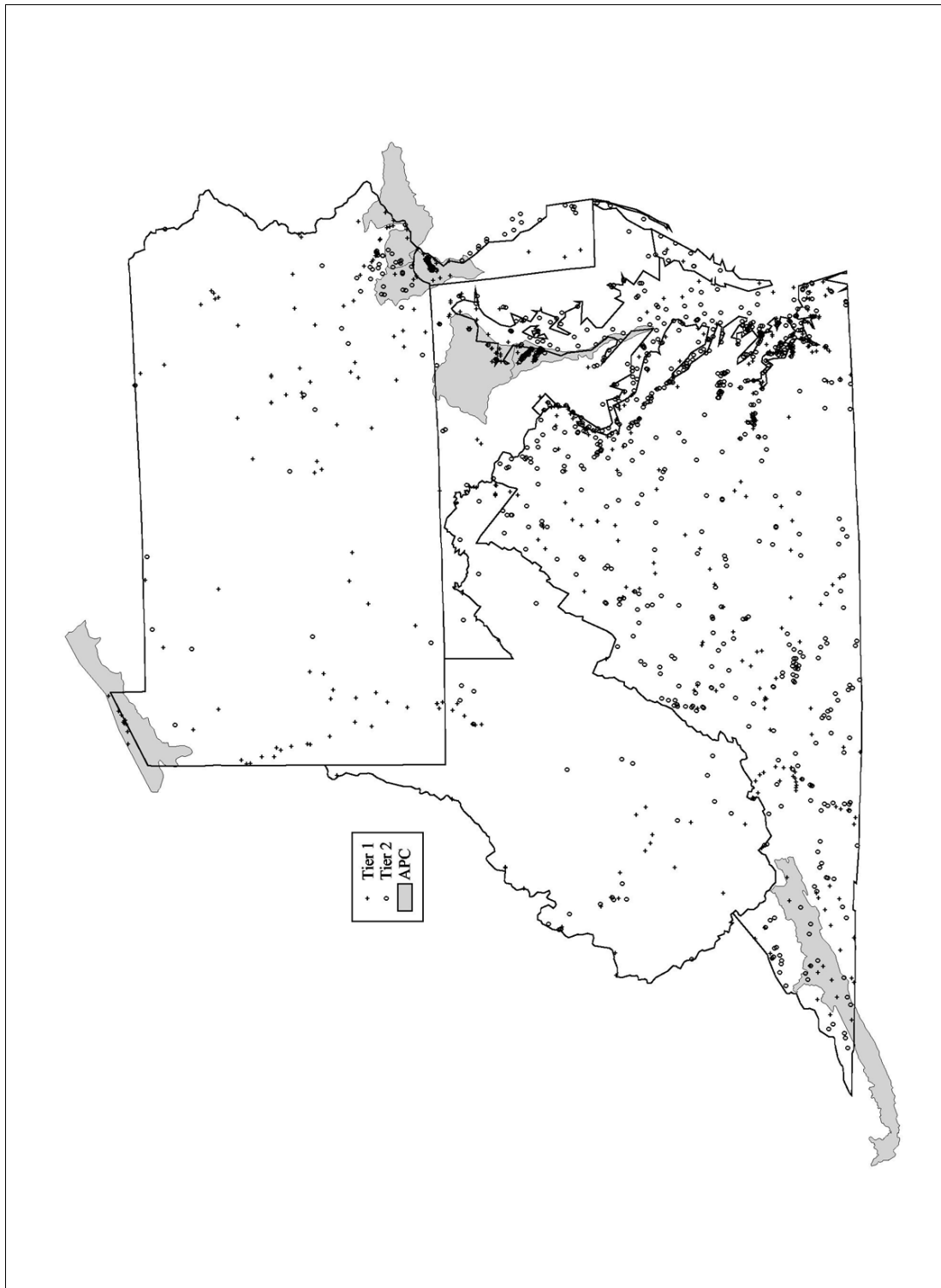
Figure 3-8. Region 3: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Table 3-16. Region 3: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
02040202	Lower Delaware	NJ, PA	26	10	15	1	96
02040205	Brandywine-Christina	DE, MD, NJ, (PA)	220	110	62	48	78
02060003	Gunpowder-Patapsco	MD, (PA)	32	23	8	1	97
02060004	Severn	MD	72	29	40	3	96
04120101	Chautauqua-Conneaut	NY, OH, PA	16	13	1	2	88
06010205	Upper Clinch	TN, VA	27	10	11	6	78

[a]No data were available for states listed in parentheses.

Table 3-17. Region 3: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Christina River	85	Delaware River	3
Severn River	15	Magothy River	3
Curtis Bay	13	Bush River	2
Red Clay Creek	11	Chesepeake - Delaware Canal	2
South River	11	Brandywine Creek, East Brook	1
Lake Erie, U.S. Shore	10	Clinch River, Corder Brook	1
Brandywine Creek	6	Clinch River, North Fork	1
Black River	5	Darby Creek	1
White Clay Creek	5	Guest River	1
Chesapeake Bay	3	Mudlick Creek	1
Clinch River	3	Stock Creek	1

EPA Region 4

Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee

EPA evaluated 2,874 sampling stations in Region 4 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 435 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects were found at 920 stations, placing them in Tier 2. For human health, data for 433 sampling stations indicated probable association with adverse effects (Tier 1), and 682 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 690 sampling stations (24 percent) as Tier 1, 1,031 (36 percent) as Tier 2, and 1,153 (40 percent) as Tier 3. The NSI database sampling stations in Region 4 were located in 1,206 separate river reaches, or 12 percent of all reaches in the region. Four percent of all river reaches in Region 4 included at least one Tier 1 station, 4.5 percent included at least one Tier 2 station but no Tier 1 stations, and 3.5 percent had only Tier 3 stations (Table 3-18). Table 3-19 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 12 watersheds containing APCs out of the 308 watersheds (4 percent) in Region 4 (Table 3-18). In addition, 42 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 20 percent had at least one Tier 2 station but no Tier 1 stations, and 7.1 percent had only Tier 3 stations; 27 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 4 are illustrated in Figure 3-9.

Within the 12 watersheds in Region 4 identified as containing APCs (Table 3-20), 42 waterbodies have at least 1 Tier 1 sampling station and 9 waterbodies have 10 or more Tier 1 sampling stations (Table 3-21). For those watersheds that contain APCs, Table 3-21 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-21, Hillsborough Bay, Big Sunflower River, Ashley River, Tennessee River, Mobile Bay, Turtle River, Pensacola Bay, Chattahoochee River, and Black Bayou appear to have the most significant sediment contamination in Region 4.

Table 3-18. Region 4: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	10,078	Total Number of Watersheds	308
River Reaches with at Least One Tier 1 Station	402 (4%)	Watersheds Containing APCs	12 (3.9%)
		Watersheds with at Least One Tier 1 Station	130 (42.2%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	454 (4.5%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	62 (20.1%)
River Reaches with All Tier 3 Stations	350 (3.5%)	Watersheds with All Tier 3 Stations	22 (7.1%)
River Reaches with No Data	8,872 (88%)	Watersheds with No Data	82 (26.6%)

Table 3-19. Region 4: Evaluation Results for Sampling Stations and River Reaches by State.

State	Total Number of Stations Evaluated	Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
		Station Evaluation						River Reach Evaluation[a]							
Alabama	173	56	32.4	54	31.2	63	36.4	-	42	27	37	106	1,592	6.7	4.3
Florida	1,157	198	17.1	379	32.8	580	50.1	15	74	108	75	257	888	28.9	20.5
Georgia	263	102	38.8	122	46.4	39	14.8	-	85	62	32	179	1,707	10.5	8.6
Kentucky	63	24	38.1	27	42.9	12	19.1		31	30	18	79	1,276	6.2	4.8
Mississippi	187	80	42.8	57	30.5	50	26.7	-	32	14	15	61	995	6.1	4.6
North Carolina	291	23	7.9	123	42.3	145	49.8	-	27	94	80	201	1,456	13.8	8.3
South Carolina	576	131	22.7	212	36.8	233	40.5	-	87	103	93	283	1,110	25.5	17.1
Tennessee	164	76	46.3	57	34.8	31	18.9	-	59	45	19	123	1,490	8.3	7.0
Region 4[e]	2,874	690	24.0	1,031	35.9	1,153	40.1	15	402	454	350	1,206	10,078	12.0	8.5

[a] River reaches based on EPA River Reach File (RF1).
[b] Percent of all stations evaluated in the NSI in the state.
[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.
[d] No stations in these reaches were included in Tier 1.
[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
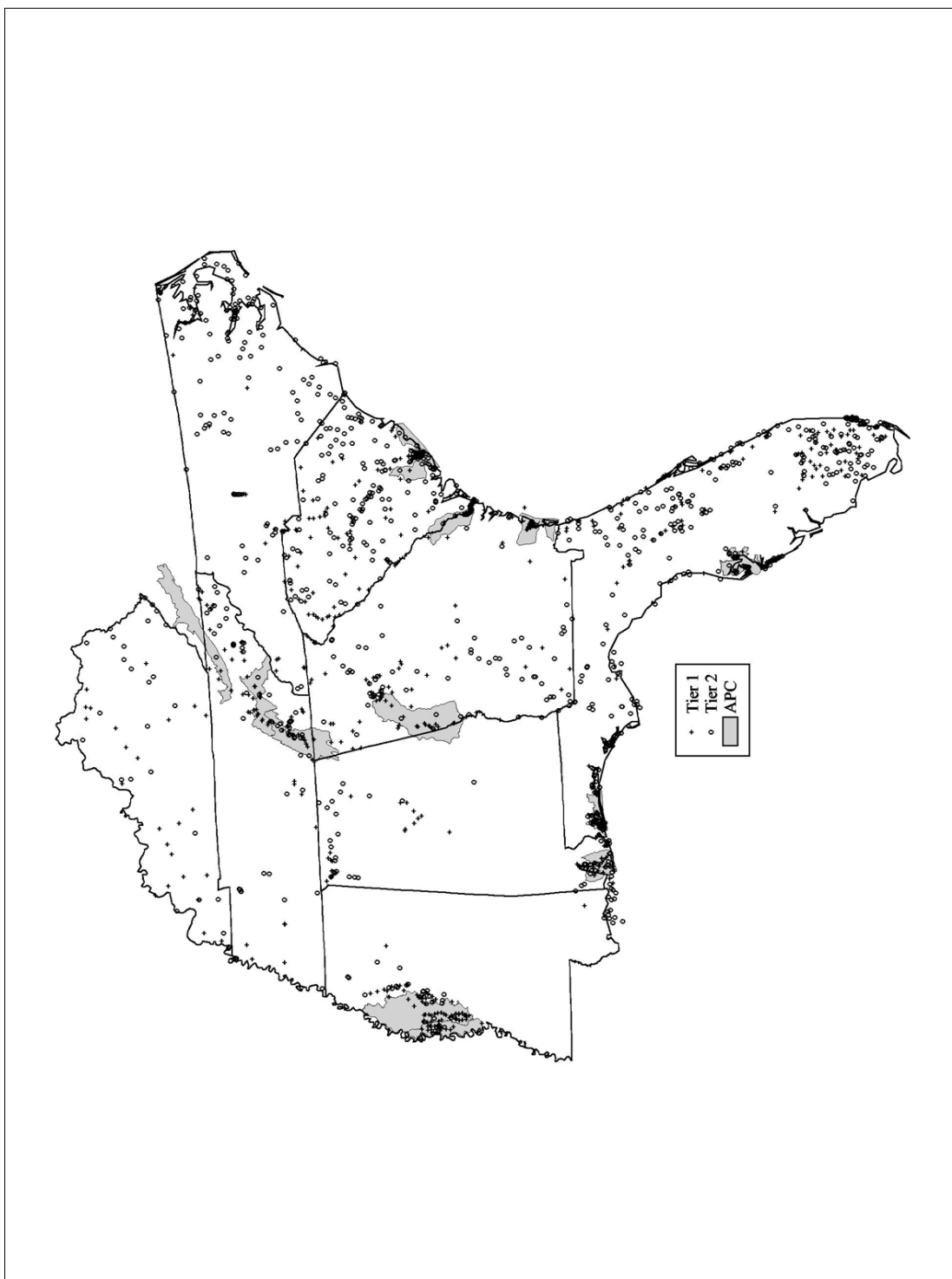
Figure 3-9. Region 4: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Table 3-20. Region 4: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
03050202	South Carolina Coastal	SC	60	21	27	12	80
03060109	Lower Savannah	GA, SC	68	11	50	7	90
03070203	Cumberland-St. Simons	GA	30	21	6	3	90
03100206	Tampa Bay	FL	70	35	23	12	83
03130002	Middle Chattahoochee-Lake Harding	AL, GA	26	21	4	1	96
03140105	Pensacola Bay	FL	59	15	30	14	76
03160205	Mobile Bay	AL	31	17	14	0	100
06010201	Watts Bar Lake	TN	19	16	3	0	100
06010205	Upper Clinch	TN, VA	27	10	11	6	78
06020001	Middle Tennessee-Chickamauga	GA, TN, (AL)	33	15	12	6	82
08030207	Big Sunflower	MS	38	34	4	0	100
08030209	Deer-Steele	MS, (LA)	24	16	8	0	100

[a]No data were available for states listed in parentheses.

Table 3-21. Region 4: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Hillsborough Bay	27	Utoy Creek	2
Big Sunflower River	21	Atlantic Ocean	1
Ashley River	18	Bullfrog Creek	1
Tennessee River	18	Carpenter Creek	1
Mobile Bay	15	Clinch River	1
Turtle River	15	Cumberland River	1
Pensacola Bay	14	Deer Creek	1
Chattahoochee River	13	Dorchester Creek	1
Black Bayou	11	Fort Lakeoudoun Lake	1
Savannah River	8	Hillabatchee Creek	1
Watts Bar Lake	8	Intracoastal Waterway	1
Little Sunflower River	6	Lake Harding	1
Tampa Bay	6	Lake Washington	1
Bogue Phalia	5	Norris Lake	1
Lake Chickamauga	3	Noses Creek	1
Savannah River, South Channel	3	Old Tampa Bay	1
Steele Bayou	3	Quiver River	1
Jekyll Lake	2	Silver Creek	1
Long Cane Creek	2	St. Simons Lake	1
Muddy Creek	2	W. Chickamauga Creek	1
St. Simons Sound	2	West Pont Lake	1

EPA Region 5

Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

EPA evaluated 3,190 sampling stations in Region 5 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 608 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 1,065 stations, placing them in Tier 2. For human health, data for 776 sampling stations indicated probable association with adverse effects (Tier 1), and 638 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 1,122 sampling stations (35 percent) as Tier 1, 1,084 (34 percent) as Tier 2, and 984 (31 percent) as Tier 3. The NSI database sampling stations in Region 5 were located in 1,249 separate river reaches, or 20.3 percent of all reaches in the region. Nine percent of all river reaches in Region 5 included at least one Tier 1 station, 6.4 percent included at least one Tier 2 station but no Tier 1 stations, and 5.3 percent had only Tier 3 stations (Table 3-22). Table 3-23 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 23 watersheds containing APCs out of the 278 watersheds (8 percent) in Region 5 (Table 3-22). In addition, 51 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 11 percent had at least one Tier 2 station but no Tier 1 stations, and 6.5 percent had only Tier 3 stations; 23 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 5 are illustrated in Figure 3-10.

Within the 23 watersheds in Region 5 identified as containing APCs (Table 3-24), 77 waterbodies have at least 1 Tier 1 sampling station and 13 waterbodies have 10 or more Tier 1 sampling stations (Table 3-25). For those watersheds that contain APCs, Table 3-25 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-25, Sheboygan River, Lake Michigan, Mississippi River, Illinois River, Fox River, Des Plains River, Menominee River, Chicago Sanitary Ship Canal, White River, Duck Creek, Green River, Salt Creek, and Kanakee River appear to have the most significant sediment contamination in Region 5.

Table 3-22. Region 5: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	6,151	Total Number of Watersheds	278
River Reaches with at Least One Tier 1 Station	527 (8.6%)	Watersheds Containing APCs	23 (8.3%)
		Watersheds with at Least One Tier 1 Station	142 (51.1%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	393 (6.4%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	30 (10.8%)
River Reaches with All Tier 3 Stations	329 (5.3%)	Watersheds with All Tier 3 Stations	18 (6.5%)
River Reaches with No Data	4,902 (79.7%)	Watersheds with No Data	65 (23.4%)

Table 3-23. Region 5: Evaluation Results for Sampling Stations and River Reaches by State.

| State	Total Number of Stations Evaluated	Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
				Station Evaluation							River Reach Evaluation[a]				
Illinois	1,370	464	33.9	554	40.4	352	25.7	-	233	172	85	490	936	52.4	43.3
Indiana	233	111	47.6	86	36.9	36	15.5	-	59	49	19	127	561	22.6	19.3
Michigan	30	12	40.0	12	40.0	6	20.0	-	12	11	5	28	1,178	2.4	2.0
Minnesota	339	140	41.3	33	9.7	166	49.0	-	100	26	96	222	1,392	16.0	9.1
Ohio	441	67	15.2	242	54.9	132	29.9	-	47	101	52	200	1,056	18.9	14.0
Wisconsin	777	328	42.2	157	20.2	292	37.6	-	123	58	81	262	1,210	21.7	15.0
Region 5[e]	3,190	1,122	35.2	1,084	34.0	984	30.9	-	527	393	329	1,249	6,151	20.3	15.0

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
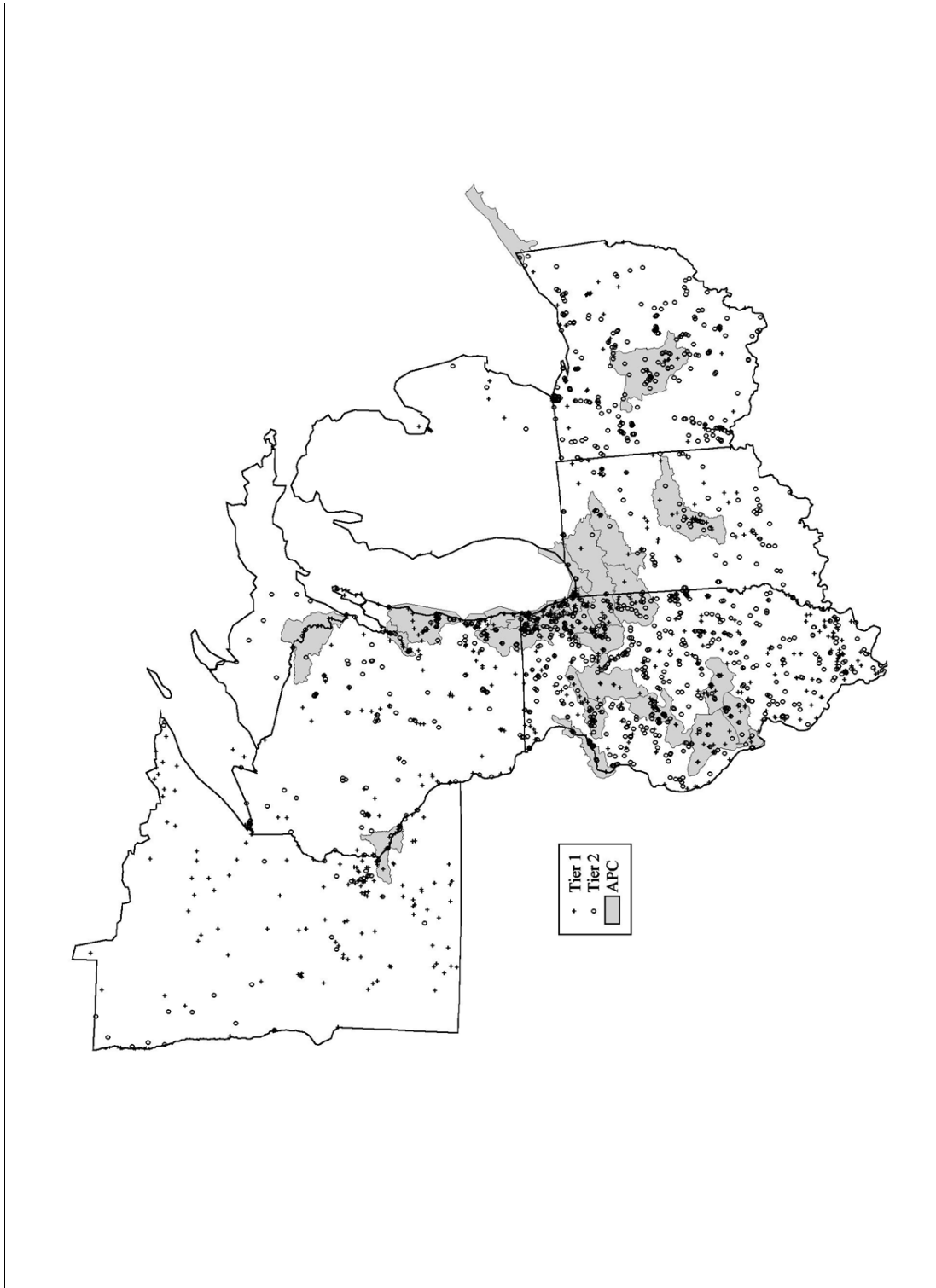
Figure 3-10. Region 5: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

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Table 3-24. Region 5: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
04030101	Manitowoc-Sheboygan	WI	225	142	32	51	77
04030108	Menominee	MI, WI	21	17	3	1	95
04030204	Lower Fox	WI	26	16	5	5	81
04040001	Little Calumet-Galien	IL, IN, (MI)	24	20	3	1	96
04040002	Pike-Root	IL, WI	60	40	12	8	87
04120101	Chautauqua-Conneaut	NY, OH, PA	16	13	1	2	88
05060001	Upper Scioto	OH	50	10	32	8	84
05120106	Tippecanoe	IN	25	16	4	5	80
05120201	Upper White	IN	42	22	14	6	86
07040001	Rush-Vermillion	MN, WI	19	10	5	4	79
07080101	Copperas-Duck	IL, IA	136	89	27	20	85
07090007	Green	IL	47	15	25	7	85
07120001	Kankakee	IL, IN, (MI)	34	15	15	4	88
07120002	Iroquois	IL, IN	29	10	18	1	97
07120003	Chicago	IL, IN	49	28	15	6	88
07120004	Des Plaines	IL, WI	81	40	36	5	94
07120005	Upper Illinois	IL	24	11	12	1	96
07120006	Upper Fox	IL, WI	81	30	34	17	79
07130001	Lower Illinois-Senachwine Lake	IL	12	11	1	0	100
07130003	Lower Illinois-Lake Chautauqua	IL	36	16	14	6	83
07130007	South Fork Sangamon	IL	16	11	5	0	100
07130011	Lower Illinois	IL	36	18	10	8	78
07130012	Macoupin	IL	19	10	9	0	100

[a]No data were available for states listed in parentheses.

Table 3-25. Region 5: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Sheboygan River	117	Horse Creek	3
Lake Michigan	45	Sugar Creek	3
Mississippi River	39	Apple Creek	2
Illinois River	35	Fall Creek	2
Fox River	32	Honey Creek	2

Table 3-25. Region 5: (Continued)

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Chicago Sanitary Ship Canal	16	Mckee Creek	2
White River	16	Olentangy River	2
Duck Creek	13	Otter Creek	2
Green River	13	Sandy Creek	2
Salt Creek	12	Ashwaubenon Creek	1
Kanakee River	11	Cicero Creek	1
Fox Lake	9	Du Page River, East Brook	1
Wolf Lake	9	Du Page River, West Brook	1
Little Calumet River	7	E Twin River	1
Deeds Creek	6	Eagle Creek	1
Tippecanoe River	6	Exline Slough	1
Indiana Harbor Canal	5	Lake Muskego	1
Mill Creek	5	Lake Springfield	1
Beaver Creek	4	Mauvaise Terre Creek	1
Hodges Creek	4	Mauvaise Terre Lake	1
Iroquois River	4	Mazon River, West Fork	1
Lake Chautauqua	4	Mud Creek	1
Macoupin Creek	4	Onion River	1
Manitowoc River, South Brook	4	Pewaukee Lake	1
Mazoon River	4	Pike River	1
Pigeon River	4	Pipe Creek	1
Root River	4	Prairie Creek	1
Sangchris Lake	4	Rock Creek	1
Scioto River	4	Sangamon River, South Fork	1
Yellow Creek	4	Sauk River	1
Calumet River	3	Spring Creek	1
Calumet Sag Channel	3	Sugar Run	1
Chicago River, N Br	3	Vermillion River	1
Du Page River	3	W. Bureau Creek	1
Lake Taylorsville	3	White Lick Creek	1
Manitowoc River	3	Wolf Lake	1
Mullet River	3		

EPA Region 6

Arkansas, Louisiana, New Mexico, Oklahoma, Texas

EPA evaluated 1,489 sampling stations in Region 6 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 185 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 396 stations, placing them in Tier 2. For human health, data for 244 sampling stations indicated probable association with adverse effects (Tier 1), and 173 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 362 sampling stations (24 percent) as Tier 1, 388 (26 percent) as Tier 2, and 739 (50 percent) as Tier 3. The NSI database sampling stations in Region 6 were located in 737 separate river reaches, or 9.7 percent of all reaches in the region. Three percent of all river reaches in Region 6 included at least one Tier 1 station, 2.9 percent included at least one Tier 2 station but no Tier 1 stations, and 4.2 percent had only Tier 3 stations (Table 3-26). Table 3-27 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 4 watersheds containing APCs out of the 403 watersheds (1 percent) in Region 6 (Table 3-26). In addition, 26 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 15 percent had at least one Tier 2 station but no Tier 1 stations, and 12 percent had only Tier 3 stations; 46 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 6 are illustrated in Figure 3-11.

Within the 4 watersheds in Region 6 identified as containing APCs (Table 3-28), 14 waterbodies have at least 1 Tier 1 sampling station and 2 waterbodies have 10 or more Tier 1 sampling stations (Table 3-29). For those watersheds that contain APCs, Table 3-29 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-29, Mississippi River and Colorado River appear to have the most significant sediment contamination in Region 6.

Table 3-26. Region 6: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	7,577	Total Number of Watersheds	403
River Reaches with at Least One Tier 1 Station	197 (2.6%)	Watersheds Containing APCs	4 (1%)
		Watersheds with at Least One Tier 1 Station	105 (26.1%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	219 (2.9%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	62 (15.4%)
River Reaches with All Tier 3 Stations	321 (4.2%)	Watersheds with All Tier 3 Stations	47 (11.7%)
River Reaches with No Data	6,840 (90.3%)	Watersheds with No Data	185 (45.9%)

Table 3-27. Region 6: Evaluation Results for Sampling Stations and River Reaches by State.

State	Total Number of Stations Evaluated	Tier 1		Tier 2		Tier 3		Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
		No.	%[b]	No.	%[b]	No.	%[b]								
Arkansas	34	12	35.3	16	47.1	6	17.7	-	17	16	5	38	883	4.3	3.7
Louisiana	396	108	27.3	100	25.3	188	47.5	-	32	41	45	118	886	13.3	8.2
New Mexico	167	10	6.0	39	23.4	118	70.7	-	11	32	49	92	941	9.8	4.6
Oklahoma	292	62	21.2	35	12.0	195	66.8	-	40	32	122	194	1,363	14.2	5.3
Texas	600	170	28.3	198	33.0	232	38.7	-	108	110	115	333	3,734	8.9	5.8
Region 6[e]	1,489	362	24.3	388	26.1	739	49.6	-	197	219	321	737	7,577	9.7	5.5

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
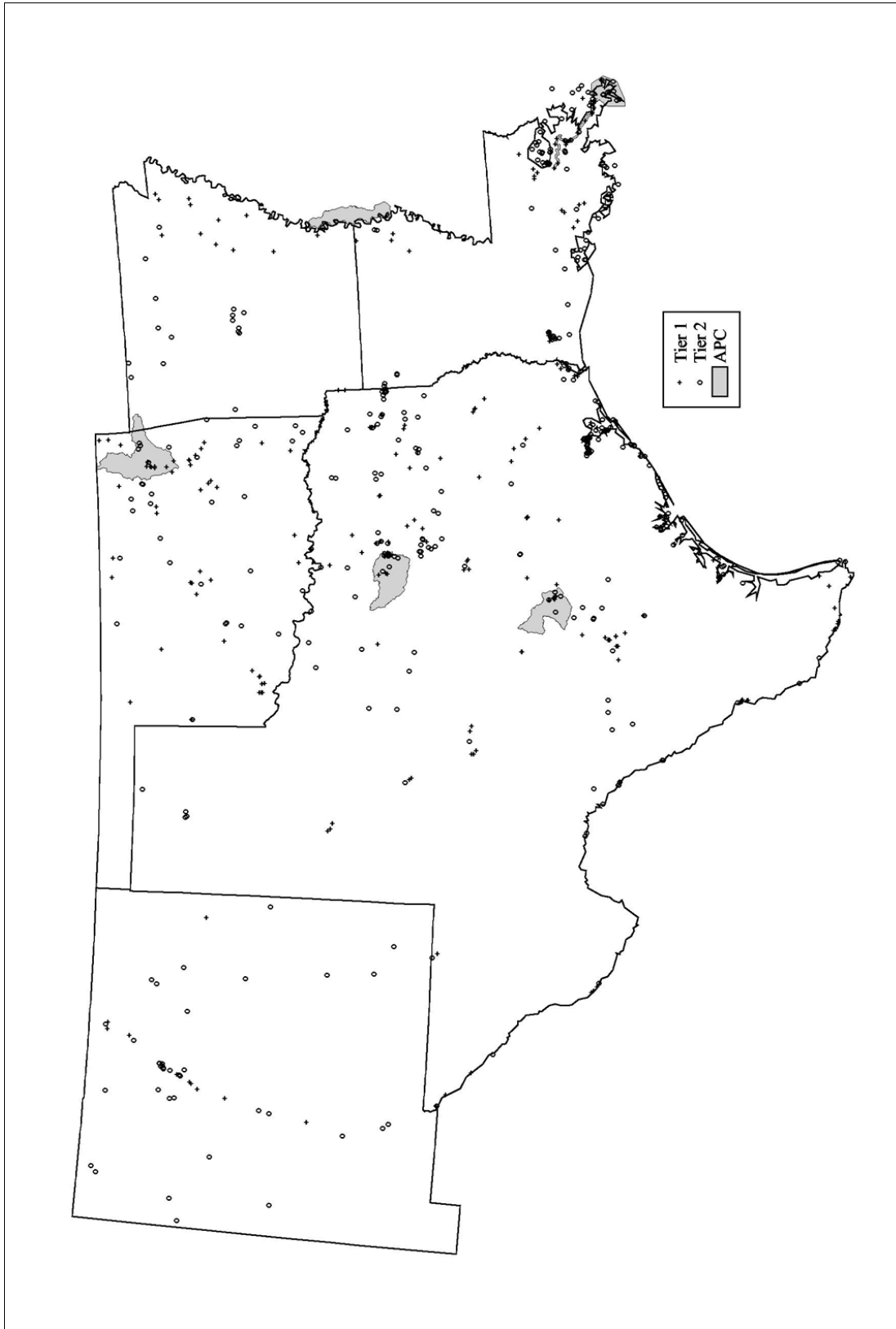
Figure 3-11. Region 6: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Table 3-28. Region 6: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)[a]	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
08090100	Lower Mississippi-New Orleans	LA	34	20	13	1	97
11070209	Lower Neosho	OK, (AR)	20	11	4	5	75
12030102	Lower West Fork Trinity	TX	31	14	13	4	87
12090205	Austin-Travis Lakes	TX	22	16	4	2	91

[a]No data were available for states listed in parentheses.

Table 3-29. Region 6: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Mississippi River	17	Gulf of Mexico	2
Colorado River	14	Barton Creek	1
Mountain Creek Lake	8	Big Fossile Creek	1
Neosho River	5	Lake Austin	1
Trinity River, West Fork	4	Lake Hudson	1
Pryor Creek	3	Mississippi River, Pass Loutre	1
Fort Gibson Lake	2	Mountain Creek	1

EPA Region 7

Iowa, Kansas, Missouri, Nebraska

EPA evaluated 583 sampling stations in Region 7 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 73 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 165 stations, placing them in Tier 2. For human health, data for 96 sampling stations indicated probable association with adverse effects (Tier 1), and 124 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 129 sampling stations (22 percent) as Tier 1, 236 (41 percent) as Tier 2, and 218 (37 percent) as Tier 3. The NSI database sampling stations in Region 7 were located in 391 separate river reaches, or 8 percent of all reaches in the region. Two percent of all river reaches in Region 7 included at least one Tier 1 station, 3.2 percent included at least one Tier 2 station but no Tier 1 stations, and 2.9 percent had only Tier 3 stations (Table 3-30). Table 3-31 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 1 watershed containing APCs out of the 239 watersheds (0.4 percent) in Region 7 (Table 3-30). In addition, 23 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 29 percent had at least one Tier 2 station but no Tier 1 stations, and 12 percent had only Tier 3 stations; 36 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 7 are illustrated in Figure 3-12.

Within the one watershed in Region 7 identified as containing APCs (Table 3-32), 2 waterbodies have at least 1 Tier 1 sampling station and 1 waterbody has 10 or more Tier 1 sampling stations (Table 3-33). For those watersheds that contain APCs, Table 3-33 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-33, the Mississippi River appears to have the most significant sediment contamination in Region 7.

Table 3-30. Region 7: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	4,915	Total Number of Watersheds	239
River Reaches with at Least One Tier 1 Station	92 (1.9%)	Watersheds Containing APCs	1 (0.4%)
		Watersheds with at Least One Tier 1 Station	55 (23%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	157 (3.2%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	68 (28.5%)
River Reaches with All Tier 3 Stations	142 (2.9%)	Watersheds with All Tier 3 Stations	29 (12.1%)
River Reaches with No Data	4,524 (92%)	Watersheds with No Data	86 (36%)

Table 3-31. Region 7: Evaluation Results for Sampling Stations and River Reaches by State.

| State	Total Number of Stations Evaluated	Tier 1		Tier 2		Tier 3		Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
		No.	%[b]	No.	%[b]	No.	%[b]								
Iowa	113	54	47.8	36	31.9	23	20.4	-	23	23	15	61	1,204	5.1	3.8
Kansas	119	20	16.8	50	42.0	49	41.2	-	18	44	42	104	1,192	8.7	5.2
Missouri	194	39	20.1	98	50.5	57	29.4	-	41	47	25	113	1,403	8.1	6.3
Nebraska	157	16	10.2	52	33.1	89	56.7	-	16	47	61	124	1,270	9.8	5.0
Region 7[e]	583	129	22.1	236	40.5	218	37.4	-	92	157	142	391	4,915	8.0	5.1

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
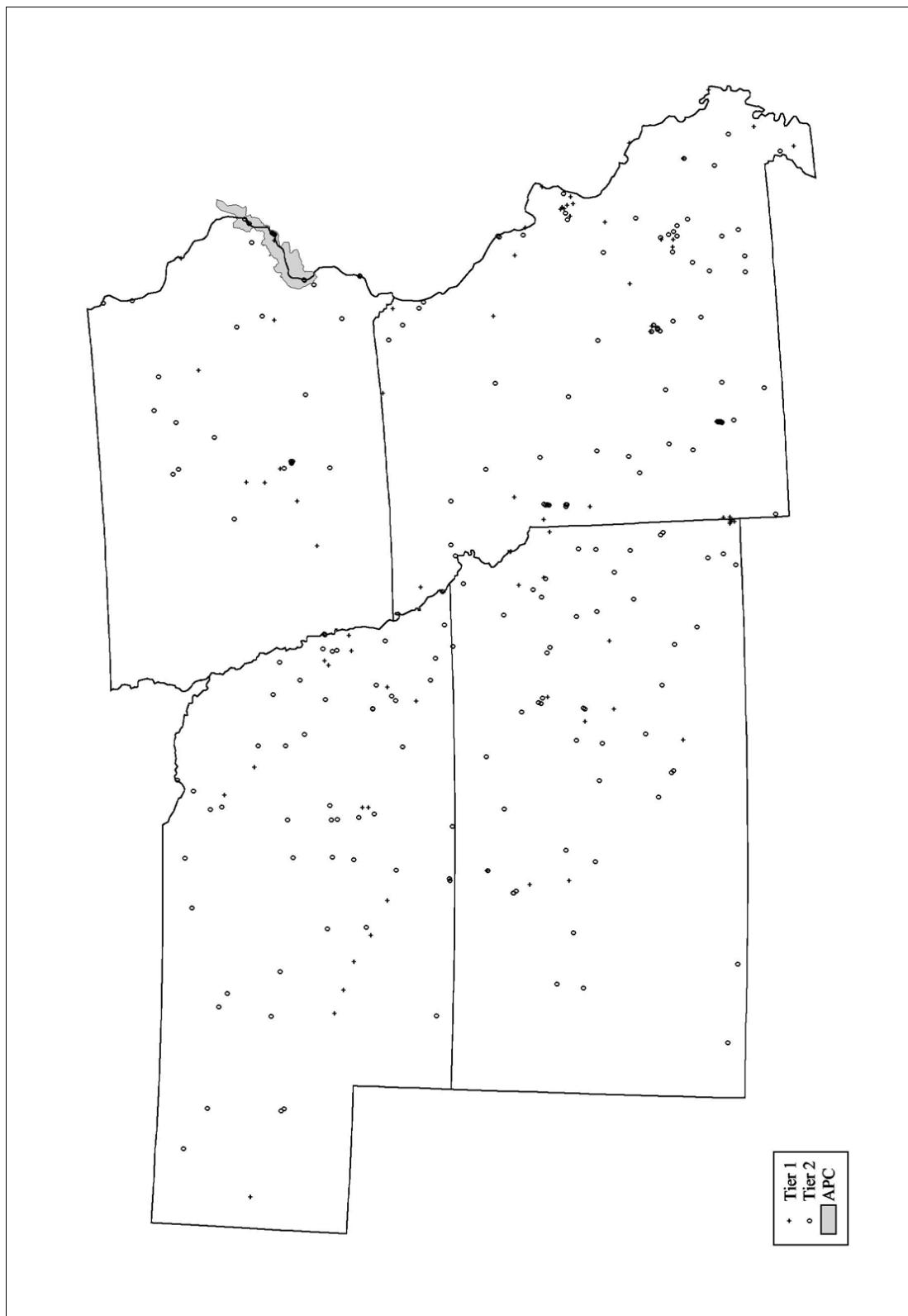
Figure 3-12. Region 7: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Legend:
+ Tier 1
o Tier 2
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Table 3-32. Region 7: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	States	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
07080101	Copperas-Duck	IL, IA	136	89	27	20	85

Table 3-33. Region 7: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Mississippi River	45	Duck Creek	1

EPA Region 8

Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

EPA evaluated 294 sampling stations in Region 8 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 59 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 105 stations, placing them in Tier 2. For human health, data for 18 sampling stations indicated probable association with adverse effects (Tier 1), and 19 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 74 sampling stations (25 percent) as Tier 1, 99 (34 percent) as Tier 2, and 121 (41 percent) as Tier 3. The NSI database sampling stations in Region 8 were located in 204 separate river reaches, or 1.5 percent of all reaches in the region. Less than 1 percent of all river reaches in Region 8 included at least one Tier 1 station, 0.6 percent included at least one Tier 2 station but no Tier 1 stations, and 0.5 percent had only Tier 3 stations (Table 3-34). Table 3-35 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 1 watershed containing APCs out of the 385 watersheds (0.3 percent) in Region 8 (Table 3-34). In addition, 7 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 8.8 percent had at least one Tier 2 station but no Tier 1 stations, and 6.5 percent had only Tier 3 stations; 77 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 8 are illustrated in Figure 3-13.

Within the 1 watershed in Region 8 identified as containing APCs (Table 3-36), 5 waterbodies have at least 1 Tier 1 sampling station and no waterbodies have 10 or more Tier 1 sampling stations (Table 3-37). For those watersheds that contain APCs, Table 3-37 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-37, Blue River appears to have the most significant sediment contamination in Region 8.

Table 3-34. Region 8: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	13,860	Total Number of Watersheds	385
River Reaches with at Least One Tier 1 Station	52 (0.4%)	Watersheds Containing APCs	1 (0.3%)
		Watersheds with at Least One Tier 1 Station	27 (7%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	82 (0.6%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	34 (8.8%)
River Reaches with all Tier 3 Stations	70 (0.5%)	Watersheds with All Tier 3 Stations	25 (6.5%)
River Reaches with No Data	13,656 (98.5%)	Watersheds with No Data	298 (77.4%)

Table 3-35. Region 8: Evaluation Results for Sampling Stations and River Reaches by State.

State	Total Number of Stations Evaluated	Station Evaluation						River Reach Evaluation[a]							
		Tier 1		Tier 2		Tier 3		Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
		No.	%[b]	No.	%[b]	No.	%[b]								
Colorado	133	48	36.1	46	34.6	39	29.3	-	32	35	23	90	2,204	4.1	3.0
Montana	11	-	-	3	27.3	8	72.7	-	-	3	9	12	5,606	0.2	0.1
North Dakota	33	5	15.2	17	51.5	11	33.3	-	7	16	4	27	1,042	2.6	2.2
South Dakota	32	18	56.3	6	18.8	8	25.0	-	11	5	8	24	1,691	1.4	1.0
Utah	56	2	3.6	17	30.4	37	66.1	-	1	14	18	33	1,080	3.1	1.4
Wyoming	29	1	3.5	10	34.5	18	62.1	-	1	13	14	28	2,474	1.1	0.6
Region 8[e]	294	74	25.2	99	33.7	121	41.2	-	52	82	70	204	13,860	1.5	1.0

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
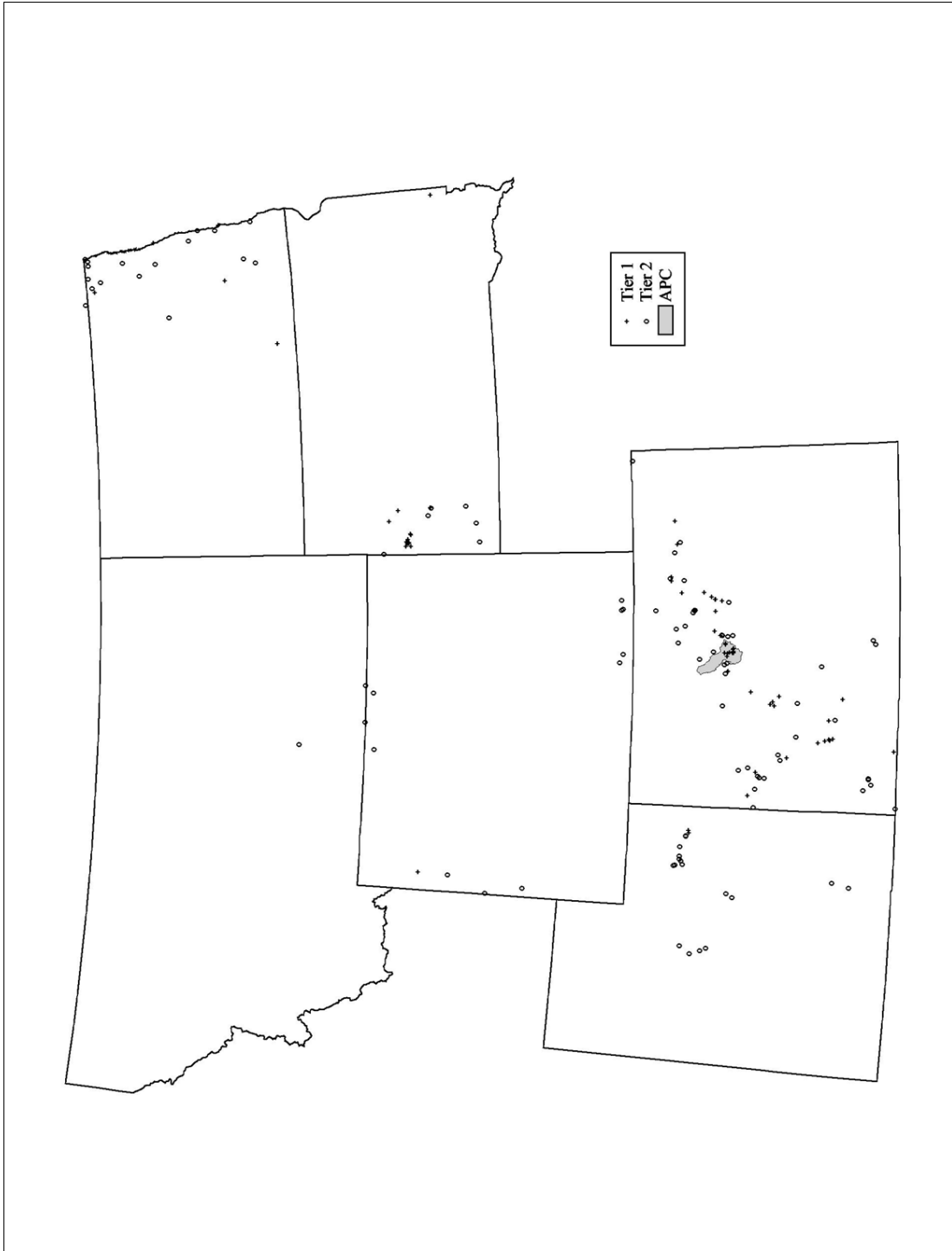
Figure 3-13. Region 8: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Table 3-36. Region 8: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
14010002	Blue	CO	15	15	0	0	100

Table 3-37. Region 8: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Blue River	8	Dillon Reservoir	1
Swan River	3	Tenmile Creek	1
Snake River	2		

EPA Region 9

Arizona, California, Hawaii, Nevada

EPA evaluated 1,752 sampling stations in Region 9 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 788 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 579 stations, placing them in Tier 2. For human health, data for 526 sampling stations indicated probable association with adverse effects (Tier 1), and 351 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 1,003 sampling stations (57 percent) as Tier 1, 452 (26 percent) as Tier 2, and 297 (17 percent) as Tier 3. The NSI database sampling stations in Region 9 were located in 259 separate river reaches, or 5.5 percent of all reaches in the region. Three percent of all river reaches in Region 9 included at least one Tier 1 station, 1.4 percent included at least one Tier 2 station but no Tier 1 stations, and 0.9 percent had only Tier 3 stations (Table 3-38). Table 3-39 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 18 watersheds containing APCs out of the 279 watersheds (6.5 percent) in Region 9 (Table 3-38). In addition, 15 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 6.5 percent had at least one Tier 2 station but no Tier 1 stations, and 3.2 percent had only Tier 3 stations; 69 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 9 are illustrated in Figure 3-14.

Within the 18 watersheds in Region 9 identified as containing APCs (Table 3-40), 33 waterbodies have at least 1 Tier 1 sampling station and 13 waterbodies have 10 or more Tier 1 sampling stations (Table 3-41). For those watersheds that contain APCs, Table 3-41 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-41, Pacific Ocean, San Diego Bay, San Francisco Bay, San Pablo Bay, Santa Ana River, Comanche Reservoir, Arcata Bay, Charro Creek, Cave Creek, Sacramento River, Suisun Bay, and Salt River appear to have the most significant sediment contamination in Region 9.

Table 3-38. Region 9: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	4,686	Total Number of Watersheds	279
River Reaches with at Least One Tier 1 Station	153 (3.3%)	Watersheds Containing APCs	18 (6.5%)
		Watersheds with at Least One Tier 1 Station	42 (15.1%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	66 (1.4%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	18 (6.5%)
River Reaches with All Tier 3 Stations	40 (0.9%)	Watersheds with All Tier 3 Stations	9 (3.2%)
River Reaches with No Data	4,427 (94.5%)	Watersheds with No Data	192 (68.8%)

Table 3-39. Region 9: Evaluation Results for Sampling Stations and River Reaches by State.

| State	Total Number of Stations Evaluated	Station Evaluation Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
Arizona	123	57	46.3	48	39.0	18	14.6	-	15	15	9	39	1,169	3.3	2.6
California	1,535	911	59.4	364	23.7	260	16.9	-	129	35	32	196	2,655	7.4	6.2
Hawaii	18	10	55.6	1	5.6	7	38.9	18	-	-	-	-	-	-	-
Nevada	76	25	32.9	39	51.3	12	15.8	-	10	19	3	32	935	3.4	3.1
Region 9[e]	1,752	1,003	57.3	452	25.8	297	17.0	18	153	66	40	259	4,686	5.5	4.7

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
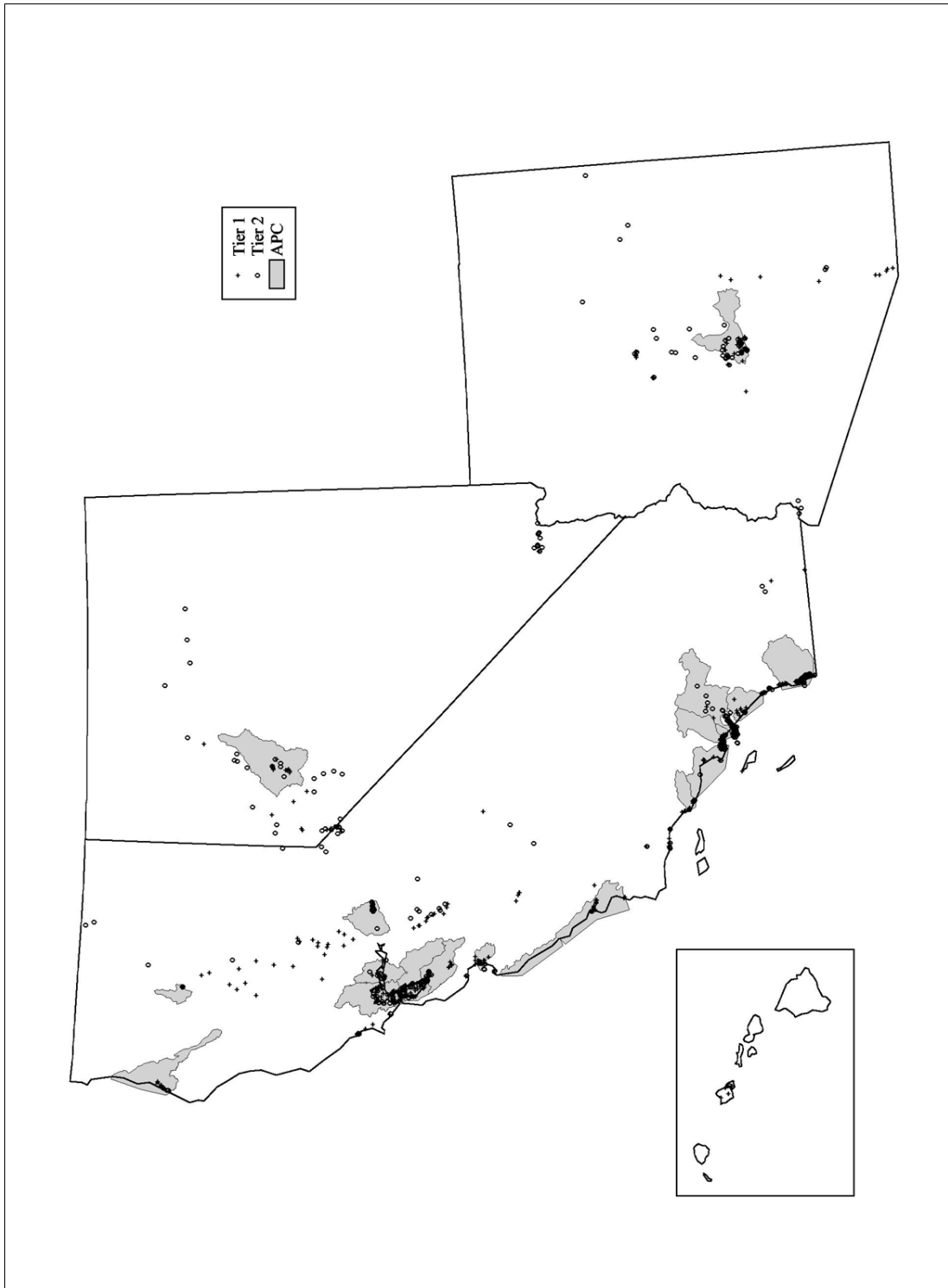
Figure 3-14. Region 9: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

Table 3-40. Region 9: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
15060106	Lower Salt	AZ	52	28	24	0	100
16050203	Carson Desert	NV	19	14	5	0	100
18010102	Mad-Redwood	CA	26	20	4	2	92
18020112	Sacramento-Upper Clear	CA	25	23	2	0	100
18040005	Lower Cosumnes-Lower Mokelumne	CA	60	23	23	14	77
18050001	Suisun Bay	CA	27	15	9	3	89
18050002	San Pablo Bay	CA	101	66	31	4	96
18050003	Coyote	CA	32	26	6	0	100
18050004	San Francisco Bay	CA	130	112	17	1	99
18060006	Central Coastal	CA	54	24	23	7	87
18060011	Alisal-Elkhorn Sloughs	CA	34	25	9	0	100
18070103	Calleguas	CA	26	24	2	0	100
18070104	Santa Monica Bay	CA	132	103	27	2	98
18070106	San Gabriel	CA	34	19	13	2	94
18070201	Seal Beach	CA	59	36	18	5	92
18070203	Santa Ana	CA	98	41	36	21	79
18070301	Aliso-San Onofre	CA	19	16	2	1	95
18070304	San Diego	CA	278	203	52	23	92

Table 3-41. Region 9: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Pacific Ocean	230	Napa River	7
San Diego Bay	154	Aa Canal	5
San Francisco Bay	127	Alisal Slough	5
San Pablo Bay	57	Aliso Creek	3
Santa Ana River	41	Calleguas Creek	3
Comanche Reservoir	23	Los Penasquitos Canyon	3
Arcata Bay	19	San Gabriel River	3
Charro Creek	19	San Juan Creek	3
Cave Creek	17	Calero Reservoir	2
Sacramento River	15	Petaluma River	2
Dominguez Channel	13	San Diego River	2

Table 3-41. Region 9: (Continued)

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Suisun Bay	13	Arroyo Trabusco	1
Salt River	11	Humboldt Bay	1
Alamitos Creek	9	Oso Creek	1
Carson River	9	San Dieguito River	1
Elkhorn Slu	9	Suisun Creek	1
Spring Creek	9		

EPA Region 10

Alaska, Idaho, Oregon, Washington

EPA evaluated 5,330 sampling stations in Region 10 as part of the NSI database evaluation. Sediment contamination associated with probable adverse effects on aquatic life was found at 1,819 of these sampling stations, placing them in Tier 1, and sediment contamination associated with possible adverse effects was found at 2,066 stations, placing them in Tier 2. For human health, data for 1.856 sampling stations indicated probable association with adverse effects (Tier 1), and 1.195 sampling stations indicated possible adverse effects (Tier 2). Overall, this evaluation resulted in the classification of 2,600 sampling stations (49 percent) as Tier 1, 1,737 (33 percent) as Tier 2, and 993 (19 percent) as Tier 3. The NSI database sampling stations in Region 10 were located in 347 separate river reaches, or 3.3 percent of all reaches in the region. Two percent of all river reaches in Region 10 included at least one Tier 1 station, 1.2 percent included at least one Tier 2 station but no Tier 1 stations, and 0.5 percent had only Tier 3 stations (Table 3-42). Table 3-43 presents a summary of sampling station classification and evaluation of river reaches for each state and for the region as a whole.

This evaluation identified 9 watersheds containing APCs out of the 219 watersheds (4 percent) in Region 10 (Table 3-42). In addition, 21 percent of all watersheds in the region had at least one Tier 1 sampling station but were not identified as containing APCs, 13 percent had at least one Tier 2 station but no Tier 1 stations, and 11 percent had only Tier 3 stations; 51 percent of the watersheds did not include a sampling station. The locations of the watersheds containing APCs and the Tier 1 and Tier 2 sampling stations in Region 10 are illustrated in Figure 3-15.

Within the 9 watersheds in Region 10 identified as containing APCs (Table 3-44), 47 waterbodies have at least 1 Tier 1 sampling station are 20 waterbodies have 10 or more Tier 1 sampling stations (Table 3-45). For those watersheds that contain APCs, Table 3-45 presents a list of all waterbodies that contain one or more Tier 1 sampling stations. Based on the information in Table 3-45, Puget Sound, Elliot Bay, Willamette River, Sinclair Inlet, Bellingham Bay, Big Creek, Duwamish Waterway, Lake Union, Lake Washington Ship Canal, Budd Inlet, Columbia River, Matheny Creek, Sams River, Lake Washington, Chambers Lake, Strait of Georgia, Roosevelt Lake, East Fork of Humptulips River, Columbia Slough, and Green River appear to have the most significant sediment contamination in Region 10.

Table 3-42. Region 10: River Reach and Watershed Classification Summary.

River Reach Classification		Watershed Classification	
Total Number of River Reaches	10,462	Total Number of Watersheds	219
River Reaches with at Least One Tier 1 Station	164 (1.6%)	Watersheds Containing APCs	9 (4.1%)
		Watersheds with at Least One Tier 1 Station	46 (21%)
River Reaches with at Least One Tier 2 Station and Zero Tier 1 Stations	126 (1.2%)	Watersheds with at Least One Tier 2 Station and Zero Tier 1 Stations	29 (13.2%)
River Reaches with All Tier 3 Stations	57 (0.5%)	Watersheds with All Tier 3 Stations	23 (10.5%)
River Reaches with No Data	10,115 (96.7%)	Watersheds with No Data	112 (51.1%)

Table 3-43. Region 10: Evaluation Results for Sampling Stations and River Reaches by State.

| State	Total Number of Stations Evaluated	Station Evaluation Tier 1 No.	Tier 1 %[b]	Tier 2 No.	Tier 2 %[b]	Tier 3 No.	Tier 3 %[b]	Number of Stations Not Identified by an RF1 Reach[c]	Reaches with at Least One Station in Tier 1	Reaches with at Least One Station in Tier 2[d]	Reaches with All Stations in Tier 3	Number of Reaches with at Least One Station Evaluated	Total Reaches in Region	Percent of All Reaches in Region with at Least One Station Evaluated	Percent of Reaches with at Least One Tier 1 or Tier 2 Station
Alaska	290	40	13.8	38	13.1	212	73.1	290	-	-	-	-	-	-	-
Idaho	38	17	44.7	10	26.3	11	29.0	-	16	11	9	36	3,298	1.1	0.8
Oregon	599	268	44.7	271	45.2	60	10.0	-	35	59	19	113	4,317	2.6	2.2
Washington	4,403	2,275	51.7	1,418	32.2	710	16.1	-	121	66	33	220	3,056	7.2	6.1
Region 10[e]	5,330	2,600	48.8	1,737	32.6	993	18.6	290	164	126	57	347	10,462	3.3	2.8

[a] River reaches based on EPA River Reach File (RF1).

[b] Percent of all stations evaluated in the NSI in the state.

[c] Stations not identified by an RF1 reach were located in coastal areas, open water areas, or areas where RF1 was not developed.

[d] No stations in these reaches were included in Tier 1.

[e] Because some reaches occur in more than one state, the total number of reaches in each category for the country might not equal the sum of reaches in the states.
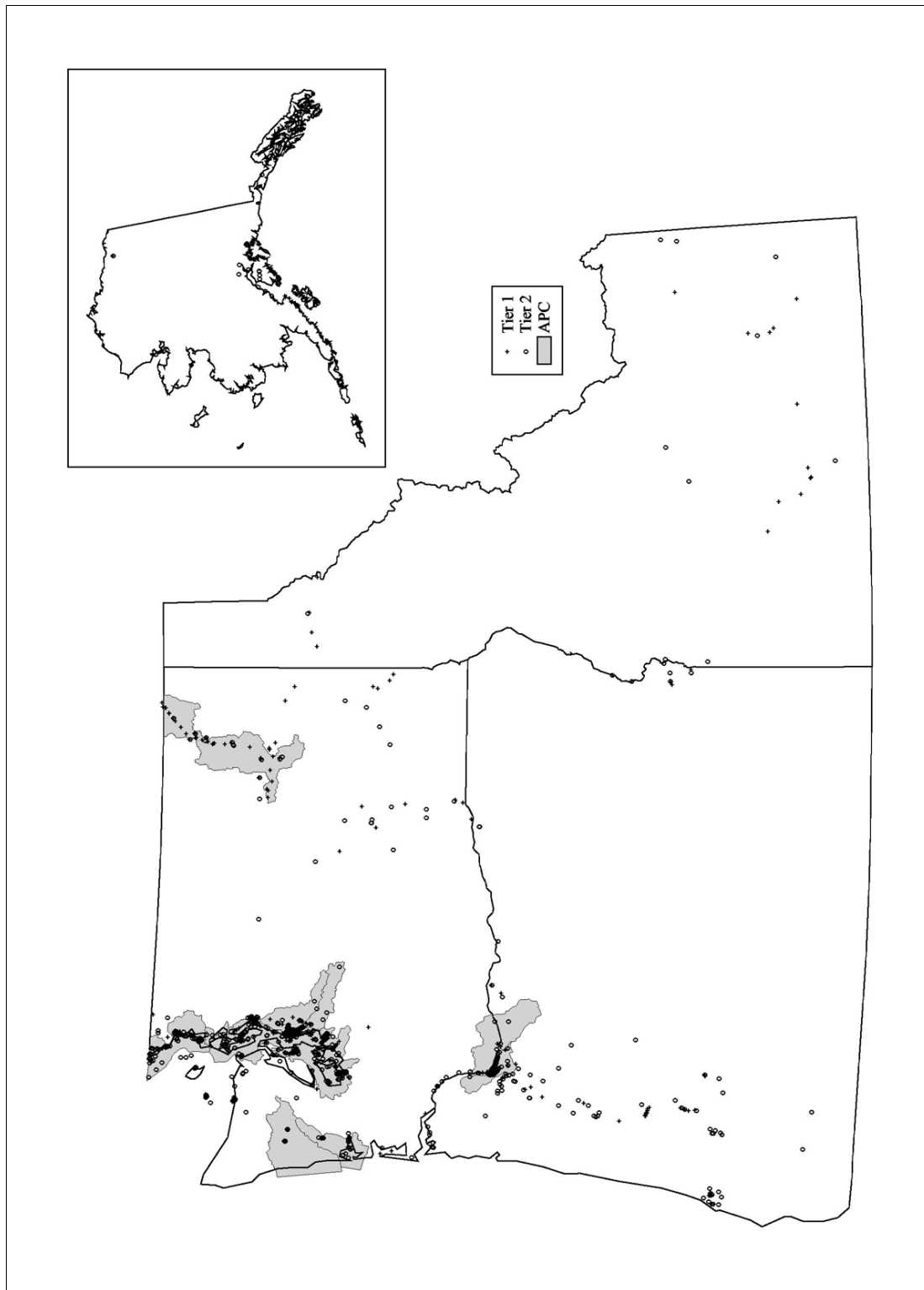
Figure 3-15. Region 10: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing APCs.

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Table 3-44. Region 10: Watersheds Containing Areas of Probable Concern for Sediment Contamination.

Cataloging Unit Number	Cataloging Unit Name	State(s)	Number of Sampling Stations				Percent of Sampling Stations in Tier 1 or Tier 2
			Total	Tier 1	Tier 2	Tier 3	
17020001	Franklin D. Roosevelt Lake	WA	66	52	9	5	92
17080001	Lower Columbia-Sandy	OR, WA	72	20	39	13	82
17090012	Lower Willamette	OR	382	215	156	11	97
17100102	Queets-Quinault	WA	108	75	25	8	93
17100105	Grays Harbor	WA	139	98	33	8	94
17110002	Strait of Georgia	WA	464	160	197	107	77
17110012	Lake Washington	WA	216	175	32	9	96
17110013	Duwamish	WA	930	577	298	55	94
17110019	Puget Sound	WA	2,178	1,073	704	401	82

Table 3-45. Region 10: Waterbodies with Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs.

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Puget Sound	779	Eld Inlet	7
Elliot Bay	485	Whidbey Island	6
Willamette River	200	Fidalgo Island	5
Sinclair Inlet	173	Vashon Island	4
Bellingham Bay	132	Johnson Creek	3
Big Creek	83	Mercer Island	3
Duwamish Waterway	77	Panther Lake Ditch	3
Lake Union	72	Sequalitchew Creek	3
Lake Washington Ship Canal	69	Whatcom Creek	3
Budd Inlet	52	Grays Harbor	2
Columbia River	51	Henderson Inlet	2
Matheny Creek	49	Onion Creek	2
Sams River	26	Port Susan	2
Lake Washington	22	Cedar Creek	1
Chambers Creek	19	Chuckanut Creek	1
Strait Of Georgia	18	Hammersley Inlet	1
Roosevelt Lake	17	Indian Island	1
Humptulips River, East Fork	13	Morey Creek	1
Columbia Slough	12	North Creek	1
Green River	12	Port Orchard	1

Table 3-45. Region 10: (Continued)

Waterbody	Number of Tier 1 Stations	Waterbody	Number of Tier 1 Stations
Portage Bay	8	Sammish Bay	1
Bainbridge Island	7	Sandy River	1
Camano Island	7	Totten Inlet	1
Dyes Inlet	7		

Evaluation of Data from First Report to Congress with Current Methodology

The data evaluation methodology (described in Table 2-2) was revised from the methodology used in the previous report to Congress to include new and updated analytical approaches. Changes were made for determining tier classification based on sediment chemistry, tissue residue, and toxicity data. Biological effects concentration approaches were replaced with an alternative empirical method, namely, a logistic regression model that is used to estimate the predicted proportion toxic. EPA's draft equilibrium partitioning guidelines (ESGs) derived from final or secondary acute values were also used in evaluating sediment chemistry data. In addition, EPA risk levels and PAH toxicity units were included to analyze sediment chemistry data. Moreover, for analyzing tissue residue data, all chemicals with log K_{ow} greater than 5.5 were evaluated, instead of dioxins and PCBs only. Toxicity data were analyzed based on one solid-phase sediment toxicity test, replacing the requirement of two or more tests using two different species. Control-adjusted survival was considered for both marine and freshwater species, whereas control-adjusted length or weight was considered for selected freshwater species sublethal toxicity tests.

In view of the preceding changes to the evaluation methodology, an analysis of the data used to evaluate stations in the first *National Sediment Quality Survey* was conducted using the current, revised methodology. This analysis allows comparison of the resulting tier classifications from both evaluation methodologies. The results of the tier classification using the previous and current methodology are presented in Table 3-46.

Table 3-46. Summary of Tier Classification Using Previous and Current Evaluation Methodologies with the NSI Data Evaluated in the Previous Report to Congress.

Tier	Previous Evaluation Methodology	Current Evaluation Methodology	Net Gain/Loss in Number of Stations
1	5,521	8,358	2,837
2	10,401	6,045	(4,356)
3	5,174	6,577	1,403
Total	21,096	20,980	(116)

A total of 21,096 stations were evaluated using the previous methodology. There is a net increase of 2,837 Tier 1 stations and a net increase of 1,403 Tier 3 stations. These increases are the result of 4,356 Tier 2 stations being classified as Tier 1 or Tier 3 by the new methodology. This decrease in the number of Tier 2 stations (a total of 4,356 stations) equals the increase of 2,837 Tier 1 stations, the increase of 1,403 Tier 3 stations, and the loss of 116 stations previously analyzed and classified as Tier 3 but not analyzed by the new methodology.

All of the 116 stations not analyzed with the current methodology were previously classified as Tier 3 stations. Certain chemicals (such as phenol and pentachlorophenol) that were evaluated using biological effects correlation approaches are not analyzed by the new methodology because they do not have any evaluation criterion for sediment chemistry analysis. Also, in the previous analysis, a sensitivity analysis related to wildlife criteria was considered although not included in the final methodology. The wildlife criteria evaluation included species not normally eaten by humans (non-edible species). Rather than reporting different numbers of stations evaluated in the previous report, those stations that were not evaluated when the wildlife criteria evaluation was not included were simply classified as Tier 3. In the current methodology, stations with only tissue data from edible species are included in the analysis or station count.

Though there are net increases in the number of Tier 1 and Tier 3 stations, as shown in Table 3-46, a total of 249 stations previously classified as Tier 1 would be classified as Tier 2 stations and 3 stations previously classified as Tier 1 would be classified as Tier 3 (see Table 3-47). Similarly 1,598 stations classified as Tier 2 by the previous method would be classified as Tier 3. More than 3,000 stations previously classified as Tier 2 would be classified as Tier 1.

Table 3-47. Transition in Tier Classification Using Previous and Current Evaluation Methodologies with the NSI Data Evaluated in the Previous Report to Congress.

Tier Classification Using Previous Methodology	Tier Classification Using Current Methodology				Total
	Not Analyzed	1	2	3	
1	0	5,269	249	3	5,521
2	0	3,080	5,723	1,598	10,401
3	116	9	73	4,976	5,174
Total	116	8,358	6,045	6,577	21,096

A significant component of the increase in Tier 1 stations is due to the new classification methodology for sediment chemistry data, followed by tissue residue data and to a lesser extent by toxicity data. Changes in the sediment chemistry methodology can be attributed to the contribution of different chemicals, metals in particular, included in the logistic regression model, as well as the use of an EPA human health cancer risk of 10^{-4} or a noncancer hazard quotient (HQ) of 10. Inclusion of all chemicals with log K_{ow} greater than or equal to 5.5 in evaluating tissue residue, instead of dioxins and PCBs only, also contributed to the increase in Tier 1 stations. Finally, the previous methodology required two or more nonmicrobial acute toxicity tests using two different species for classifying toxicity data as Tier 1. Use of toxicity data in the current evaluation methodology was based on a single solid-phase sediment test without any restrictions on control data.

Of the 3,089 stations being classified as Tier 1 (3,080 Tier 2 stations and 9 Tier 3 stations; see Table 3-47), approximately 64 percent are due to tier classification by the logistic regression model, 35 percent due to the use of a higher EPA risk criterion, around 7 percent are classified in a higher tier due to tissue residue analysis, and less than 2 percent from either the draft ESGs or PAH toxicity unit criterion. The contribution from the toxicity data toward this increase in the number of Tier 1 stations is approximately 5 percent. Of the 73 Tier 3 stations being classified as Tier 2 by the new methodology, more than 65 percent are so classified due to toxicity data and approximately 37 percent are so classified due to the logistic regression model. Because stations may be evaluated by more than one criterion, the sum of the previous percentages exceeds 100.